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ORIGINAL ARTICLES

EFFORT SYNDROME
DIAGNOSTIC AND THERAPEUTIC VALUE OF EXERCISES

By Sir Adolphe Abrahams, O.B.E., M.D. Camb., F.R.C.P.
PHYSICIAN TO THE WESTMINSTER HOSPITAL

The term effort syndrome is one which we employ, in default of a better, appreciating that none will be universally acceptable. It meets the generally established definition of the condition as one of ill health in which the signs and symptoms produced in normal subjects by excessive exercise are called forth by lesser amounts and in which no physical signs of structural disease are discovered. Alternatively, it may be defined as an abnormal physiological reaction to effort with the production of breathlessness, disproportionate or premature exhaustion, palpitations, precordial pain, faintness, dizziness and blurred vision.

Were such definitions unexceptionable, it would be reasonable to regard the subjects as exhibiting merely a depressed capacity for exertion. The cause of such an incapacity might be matter for investigation but at least it could be agreed that since physical ability is only relative the subjects under consideration are merely those who stand at the bottom of the scale. To such conclusions there are cogent objections, the first being to the question-begging adjective "excessive" as applied to exercise for normal individuals. I would prefer strenuous, severe, violent or extreme. Secondly, no degree of exercise however strenuous will produce in a healthy person the outstanding symptoms which are produced as the result of a minor degree of effort in a subject of this syndrome, and which are, moreover, to some extent present in him even without antecedent effort.

Graduated exercises have been recommended as a kind of universal treatment. The differences in individual athletic ability are well recognised, but it is argued that by exercise some degree of improvement is possible to everybody and that the grading which in consequence results will be of practical value. On this reasoning effort syndrome would be equivalent to the "out of condition" state, and would demand a course of training more or less analogous to that of an athlete preparing for a contest. Exercises have their use but their application is limited. A course of physical training will usually benefit the under-developed, ill-nourished youth who has lived under bad conditions, physical and hygienic, and who partly from disinclination, partly from lack of opportunity has never taken exercise. In him the reduced capacity for exertion is a real example of "unfitness" and he may be trained in the orthodox sense. It is often forgotten that under service conditions all sorts of advantageous circumstances are operating simultaneously: good and plentiful food, regularity in living, absence of anxiety about employment and a feeling of security on this score, discipline, and an ordered life which ensures moderation in tobacco and alcohol, and the avoidance of bad habits. The rapid improvement in physique and capacity for effort which occur in such a type are advanced as evidence of the universal value of "P.T.," but though P.T. plays a part the part is not the whole.

Subjects of postinfective asthenia often exhibit an incapacity for effort, and some infections are particularly potent in this respect, especially trench fever and influenza. It is sometimes maintained that myocardial weakness is the cause of such incapacity, but it is far more likely that the infection has affected the vasomotor system. Vasomotor stability will return in time without treatment, but its return will be hastened by such exercises as can be carried out without distress.

The toxæmic element in such cases has encouraged the belief that all, or most, sufferers from effort syndrome are victims of chronic sepsis, the eradication of which is of primary importance. Teeth and tonsils are the commonest sources of infection, followed by more remote possibilities such as the appendix, the gall-bladder and the prostate, or such nebulosities as "intestinal toxæmia." If the net cast is sufficiently fine, the instruments of precision sufficiently sensitive, and the investigation sufficiently exacting, it is possible to find some plausible abnormality in almost anybody. Latent tuberculosis and thyrotoxicosis have their adherents; while extrinsic toxins such as tobacco are indicted as additional rather than primary influences. As in the practice of medicine generally, the enthusiasts for focal sepsis occasionally score brilliant successes but encounter far more disappointments. It is well to eradicate an obvious source of sepsis, but it is the experience of most observers that the number of cases of effort syndrome which can be attributed to this cause is exceedingly small.

MUSCLE AND MIND

If properly organised, exercises have a psychological value. Their character must be varied, they must be intrinsically interesting instead of mere monotonous repetitions of stereotyped movements, and they must demand unremitting attention. In this way it is possible to ensure half an hour's sustained activity in a man who would fall out in five minutes of the tedious procedure comprehended under the one-time P.T. The man who has entertained the conviction that he has a cardiac defect, or at least a constitution, which must not be subjected to the hazards of exertion may be reassured by discovering that exercise does not lead to calamity, and not even, after a time, to symptoms which he had supposed to indicate "heart weakness" or "heart strain." As a member of a suitable class he will have the advantage of encouragement, competition and emulation, and may come in due course to take a pride in achievement and the cultivation of fitness. At the same time it is best that he should be occupied in a useful and interesting manner for most of the day, so that he has no time for introspection or for undesirable habits which are often the consequence of boredom.

Exercises serve a useful purpose in grading. If a man can accomplish half an hour of systematic vigorous exertion and at the end exhibit no distress and no undue delay in deceleration of the cardiac rate, his circulatory integrity is established and there is no reason why the physical requirements of an ordinary military life should not be met. But no system of exercises can test the reaction to unalluring or distasteful circumstances, or guarantee that symptoms and even physical signs will not be forthcoming when escape is sought from an intolerable situation. This is a psychological problem and it must be left to the psychiatrist, not to the clinical physician, to assess the individual's probable reaction to circumstances and responsibilities.

It is comparatively easy to recognise the subject of post-infective debility and the under-developed type that can be improved in the manner described. But the crucial problem is in respect of the fundamentally unsound: is the essential fault ascertainable and eradicable or must a fatalistic view of complete failure be accepted? Exercise is a complicated process into which enter a variety of factors, including the myocardium, the blood, the respiration, the muscles in their biochemical aspect, the nervous system and the mental outlook. It is a simple but defeatist conclusion to regard the nervous as the essential factor in effort syndrome, when jerky maladjustment displaces orderly coördination. In such cases, exercises, far from producing any improvement, are likely to aggravate the symptoms. This applies at any rate to exercises of the usual P.T. type, although it has been suggested that better results might be expected by a system more minutely graduated in which encouragement would presumably play a great part.

The exercise-tolerance test is often condemned as inadequate or useless, although it is not easy to ascertain what exactly the critics have in mind or what they suppose it is intended to test. All that can be determined is the capacity for exertion as indicated by circulatory efficiency. But nothing can test the willingness of the man, and here those responsible for the disposal of subjects of effort syndrome have an obvious difficulty. A man may exercise vigorously without distress and demonstrate the integrity of his circulation, and may yet complain of various subjective sensations

(exhaustion, giddiness or precordial pain) either soon after or sometimes two or three hours after completing the effort.

In the last war I was familiar with one of the greatest athletes in the world, capable on the running track of extreme exertion, who evaded military service by presenting symptoms and even physical signs, such as fainting, whenever military duties were demanded. What attitude should be taken in such circumstances? Psychologists maintain that to ignore complaints in the absence of physical accompaniments, and perhaps to enforce strict military discipline, is only to court the production of more and worse symptoms; but the modern medical officer has sufficient sense of duty, confidence in his clinical knowledge, and courage to take trivial risk, instead of referring all cases for special investigation. More rarely the converse problem arises, that of a man who at the end of his exercise has a protracted tachycardia despite his assertion of well-being. Subjectively considered, he is fit to be returned to his unit where he may well carry on; but he may report sick under stress, especially emotional stress, when objective signs will be discovered which cannot be ignored.

PHYSICAL BASIS OF SYMPTOMS

Since there is often tachycardia, the influence of the thyroid is naturally invoked and in a few instances there is evidence in favour of this explanation. On investigation, however, fundamental objections appear. At rest, the circulation of the hyperthyroidic patient resembles that of a normal person during exercise: there are tachycardia, increased cardiac output and accelerated blood flow. These factors are absent in the patient with effort syndrome, and he also fails to exhibit that constant feature of the hyperthyroidic, persistence of tachycardia during sleep.

Normally exercise results in a slight acidosis, a relative reduction of blood alkalinity which is the stimulus for increased respiratory effort. It has been thought that the patient with effort syndrome may be hypersensitive to an acid intoxication of a degree which in a normal person will produce no respiratory distress or overactivity. This might be explained by a constitutional deficiency in the buffer substances of the blood—sodium bicarbonate, sodium phosphate and proteins—which normally combine with carbon dioxide and other metabolic acids. Even at rest the subject of effort syndrome may display shallow ineffective respiration. He gives the impression, not of dyspnœa but of lazy breathing, of never having acquired the habit of accumulating enough CO_2 to afford the respiratory centre the necessary stimulus. As would be expected, response to the breath-holding test is exceedingly poor. The effects of hyperventilation in healthy subjects have naturally encouraged the expectation that some of the symptoms of effort syndrome might be explained in this way. But Guttman and Jones (1940) have satisfied themselves that when patients with effort syndrome practise hyperventilation, the cardinal symptoms are produced in very few cases; no patient in their series complained of suffocation, palpitation and left-chest pain.

The respiratory phenomenon of effort syndrome can only be described in general terms as an expression of disordered metabolism, possibly the result of suprarenal dysfunction. The abnormal sweating has provoked speculation both on the chemical side and the relation to heat loss. It is another indication of the sympathetic imbalance which characterises the syndrome and which is associated, in some instances, with vagotonia, in others with vagal insufficiency and with a general want of muscular tone especially of the abdomen. The interaction of the sympathetic nervous system with the endocrines is of course familiar.

To attempt to establish a uniform ætiology in cases of effort syndrome is fallacious. In typical examples we recognise many of the physical accompaniments of anxiety, and the chief hope of amelioration lies with the psychotherapist whose task must be to identify the chronic emotional state—conflict, fear and the like—which may be responsible. The difficulty of investigation, great enough in ordinary circumstances, is substantially enhanced by the circumstances of military service where the perpetuation of the disability is to the patient's advantage.

SUMMARY

Effort syndrome is a term vaguely employed to describe a symptomatology which may arise from various causes, some of which are constitutional and ineradicable, some pathological and amenable to treatment.

Exercises, combined with good food and a regular life, will benefit cases of postinfective debility or underdevelopment, but even in these their psychological value must not be overlooked.

In cases of effort syndrome which seem to arise from constitutional inferiority and to have no responsible physical defect the results of physical therapy have been disappointing. Their ætiology and treatment are the concern of the psychiatrist.

THE PROGNOSIS OF ACUTE INTESTINAL OBSTRUCTION

EXPERIMENTS WITH INTRAPERITONEAL SULPHANILAMIDE

BY

RUPERT VAUGHAN HUDSON, F.R.C.S.
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RODNEY SMITH, M.B. LOND., F.R.C.S.
ACTING SURGICAL REGISTRAR AT THE HOSPITAL

DURING the last twenty years important advances have been made in the treatment of many acute abdominal conditions, and fatality-rates have correspondingly fallen. In acute intestinal obstruction, however, while progress has certainly been made, the fatality-rate in most published figures is still between 20% and 30%. In an attempt to ascertain the factors responsible for this high figure a series of 670 consecutive cases has been analysed at this hospital, and the results have been compared with those of Burgess (1923) and Warthen (1936) because their classification is sufficiently similar to the one we have adopted.

Burgess published a series of 1278 cases, with a fatality-rate of 28·8%. In our series the rate is 22·4%. In both these series the two commonest single causes of obstruction were strangulated external hernia and carcinoma of the colon. The fatality-rate of acute on chronic obstruction from carcinoma of the colon was 34·1% in Burgess's series; in our series it is 31·6%. In Burgess's figures the fatality-rate of strangulated external hernia was 23%; in our series it is 14%, and the fatality-rate of all small-gut obstructions is only slightly higher, 16·7%. There is, then, a great improvement in the prognosis of strangulated external hernia and of obstruction of the small gut, but very little in the prognosis of acute on chronic large-gut obstruction. Of the factors responsible for the improved outlook in obstruction of the small gut probably the main one is earlier diagnosis and earlier operation. Holt (1928), urging the importance of the time factor in acute obstruction, says that in his cases there was a fatality-rate of about 60% in the late cases exhibiting systemic signs. Warthen found that among white patients the fatality-rate was 19·5%, while it was 42·3% in blacks, and that, on an average, the time elapsing between onset of symptoms and admission to hospital in blacks was about double that in whites.

It is generally agreed that the high fatality in late cases is due to complications. Is there a single complication which is sufficient to alter the entire outlook? The complications which may arise are:—

1. Dehydration and chloride loss.
2. Absorption of toxins.
3. Vascular damage to the gut wall, the final result of which is gangrene, perforation, and if the gut is lying in the general peritoneal cavity peritonitis.

Of these, vascular damage to the gut is of vital importance because, even in the absence of gangrene, it often means that simple release of the obstructed gut is not sufficient and that further operative measures have to be taken. Dehydration and toxæmia are not difficult to treat per se, provided that simple release is the sole

operative measure necessary to relieve the obstruction. In Warthen's series simple release was practicable in only 37% of cases, compared to our 66·5%, and his total fatality was correspondingly higher, 34% to our 22·4%.

THE DANGERS OF RESECTION

In 62 out of our 670 cases part of the gut was not considered viable and a resection was carried out; 48 of these died, a fatality-rate of 77·4%. Of our 300 cases of strangulated external hernia 30 required a resection of gut and 24 of these died, a fatality-rate of 80%. Of the 270 cases in which simple release was practised only 18 died, a fatality-rate of 6·7%. Why should there be this appalling difference in the prognosis when the gut changes from viable to non-viable? It has been claimed that patients in whom a resection is necessary are already desperately ill, that they are suffering from the effects of extreme dehydration and absorption of toxins and are therefore unable to stand the effects of an operation, or that although able to stand a short operation they cannot stand the necessary gut resection. If this were so one would expect that in the vast majority of fatal cases the patient would die at any rate within a day or so of operation. In actual fact this explanation of the high fatality is entirely false. In a few of our 62 cases of resection the patient was in extremis on admission, and, in spite of efforts at resuscitation and an operation carried out as speedily as possible at what was considered to be the optimum moment, died soon afterwards. In a considerable number of cases, however, the patient was not in extremis and there were no systemic signs whatever, the discovery of non-viable gut being apparently quite unexpected. This was particularly common where the strangulated gut was outside the general peritoneal cavity—in an external hernial sac. In the majority of cases there was a moderate degree of dehydration or toxæmia but certainly not enough to render the patient unfit to stand a resection of gut, which need not cause much operative shock if certain technical details are observed. Nor does the patient necessarily die soon after operation. A certain number, of course, do die rapidly, overwhelmed by toxæmia or general peritonitis present before operation as a result of perforation of gangrenous gut. But the majority survive the immediate hazards of operation and the next few days. These may die at any time up to six weeks after operation, the commonest danger periods being abqut the fifth and about the tenth day. The symptoms are typical of an increasing mechanical obstruction—colicky pains, exaggerated peristalsis, vomiting and increasing distension. At autopsy the cause of death is found to be a plastic peritonitis of a variable but fatal degree, with much adhesion of gut to gut, and gut to abdominal wall, and an œdematous intestine full of foul material, with multiple sites of obstruction.

THE CAUSE OF LOCAL PERITONITIS

Were it possible to eliminate this local peritonitis the fatality of gut resections would drop considerably. It seems certain that the organisms producing it must have come from inside the gut. They may reach the peritoneal cavity before, during, or after operation. Before operation, organisms might conceivably pass through the damaged gut wall before actual gangrene had occurred, and clearly the peritoneum will be flooded with organisms if a gangrenous coil of gut lying in the peritoneal cavity perforates. At operation, however good the aseptic technique, organisms are bound to escape when the gut is opened. After operation, since only undamaged gut is left, organisms are only likely to escape if the anastomosis leaks.

It seems unlikely that in most cases fatal contamination of the peritoneum takes place before operation.

Thus, in our series actual perforation was rarely found; it was only in these few cases that obvious signs of peritonitis were present and then only if the perforated gut was lying in the general peritoneal cavity. Moreover, the fatality-rate after resection of a coil of gut lying in an external hernial sac and sealed off from the general peritoneal cavity was 80%, while the mortality after resection of a coil which had been lying in the general peritoneal cavity was actually slightly less, 75%. If the passage of organisms through the gut wall was of significance one would imagine that the fatality would be much higher in cases where the gut was inside the peritoneal cavity.

Contamination of the peritoneum by leakage of the anastomosis after operation is also not of importance in the majority of cases, for at a second operation or autopsy there was asserted to be evidence of leakage in only one case in our series. The areas of plastic peritonitis, although in the region of the anastomosis in most cases, are not necessarily so, and the area around the anastomosis is sometimes free from adhesion or peritonitis, which is centred in another part of the abdomen.

Some organisms probably do pass through the gut wall before operation but not to a great extent unless gangrene and perforation have occurred; the main contamination of the peritoneum probably takes place at operation and is due to the gut being opened. In support of this view, 3 of the cases of gangrene in our series were treated by exteriorisation, with the intention of performing a subsequent operation for the reconstruction of the normal intestinal tract. Of these, 2 survived, but both of them died after the second operation for closure of the fistula, the surgeon being forced to open the peritoneal cavity and the gut. If we divide our 670 cases into two groups according to whether the gut was opened or not we find that of 224 cases in which the gut was opened 137 died, a fatality of 61·2%; 68 of these were small gut, 54 dying, a fatality-rate of 79·4%; 156 were large gut, with 83 deaths, a fatality-rate of 53·2%. But of the 446 cases where only simple release was necessary 23 died, a fatality-rate of 5·2%. The prognosis in the cases requiring opening of the gut was necessarily much worse, but nevertheless the difference is so great as to suggest that opening the gut provides a new lethal factor sufficient to weigh the scales against the patient.

THE PROGNOSIS

This, then, is the prognosis of acute intestinal obstruction. If simple release can be practised the outlook is good, the fatality in our series being only 5·2%. If the gut has to be opened, either to perform an anastomosis, to drain the gut or to perform a resection, the prognosis is much worse, in our series the fatality being 53·2% in large-gut and 79·4% in small-gut obstruction. In cases requiring resection of gut the rate was 77·4%. A reduction in the deaths from acute intestinal obstruction can be attained in two ways, by earlier diagnosis and by more successful treatment and prevention of the lethal complications which result from delay in diagnosis. With a view to preventing such complications we have carried out a series of animal experiments.

Experiments with Intraperitoneal Sulphanilamide

We have employed oral chemotherapy in the treatment of postoperative peritonitis, but to our disappointment it was unsuccessful and in one or two cases even seemed to have a deleterious effect. We therefore devised experiments on rabbits with the object of ascertaining (1) whether deliberate contamination of the peritoneal cavity with the contents of the gut does in fact cause a plastic peritonitis of the kind often found in man after a resection of gut; (2) if so, whether there is one causative organism which can be recovered later from the infected peritoneum and grown in pure culture; (3) whether such a peritonitis can be prevented or modified by the local application of sulphanilamide into the peritoneal cavity; and (4) if so, whether oral sulphanilamide is as effective as intraperitoneal sulphanilamide.

FIRST EXPERIMENT

As a preliminary investigation, a suspension in saline of 300 mg. of sulphanilamide per kg. body-weight was injected into the peritoneal cavity of each of two rabbits, a dose equivalent to about 15 g. in man. Blood was taken at intervals and its sulphanilamide content estimated. It was found that absorption was completed in 30 hours, and the drug produced no ill effects or local reaction in the peritoneum.

SECOND EXPERIMENT

The next experiment was carried out to ascertain the effect of intraperitoneal sulphanilamide on the reaction of the peritoneum of rabbits to the organisms inside their own gut. The abdomen of each of 12 rabbits was opened and intestinal contents withdrawn through a small

puncture in the cæcum. Although we were primarily interested in the organisms in the small gut, contents were withdrawn from the cæcum because the small gut was nearly always found at operation to be empty, and it was not considered probable that the organisms living just distal to the ileo-cæcal valve would differ from those just proximal. Moreover, the puncture in the cæcum could be easily closed, while the lumen of the small gut was so small that it was feared that any attempt to make certain that the puncture did not leak after operation would result in undue narrowing of the gut. The puncture was closed with a fine catgut purse-string suture and the intestinal contents withdrawn were then injected into the right half of the peritoneal cavity, from the right hypochondrium to the right iliac fossa. In 3 of the rabbits the abdomen was then closed. In 6 others, before closing the abdomen, a suspension in saline of 300 mg. of sulphanilamide per kg. body-weight was injected into the peritoneal cavity. In 3 others the abdomen was closed and the rabbit was then given the same dosage of sulphanilamide through a stomach-tube. After a week each rabbit was killed and the abdomen opened and examined. The findings are summarised in the table.

CONTROLS; NO SULPHANILAMIDE

Rabbit No. 1.—Gut adherent to anterior abdominal wall at site of the puncture, over area ¼ in. × ¼ in. Abscess ¼ in. × 1 in. in right flank; at this point large gut was adherent to small with kinking of the latter and gut was adherent to anterior abdominal wall over area 2 in. × 1 in.

No. 2.—Gut not adherent to abdominal wall. At site of puncture, not in contact with abdominal wall, there was an abscess 1 in. × 1½ in. from which had spread a local peritonitis involving several coils of gut over area of 3½ in. × 2½ in. Multiple small abscesses on posterior surface of anterior abdominal wall, from right iliac fossa to right hypochondrium. Under pylorus large gut adherent to small with small abscess. Scattered flakes of lymph throughout left side of abdomen. Injection of mesentery of whole of small gut.

No. 3.—Gut adherent to abdominal wall over site of puncture with localised abscess 2 in. × 1 in. Small localised abscesses in liver. Abscesses throughout abdomen, localised by adherent coils of gut and mesentery. Injection of whole peritoneum—general peritonitis.

INTRAPERITONEAL SULPHANILAMIDE

No. 4.—Localised peritonitis, ¼ in. × ¼ in. around site of puncture, where gut was adherent to anterior abdominal wall. No spread outside immediate locality of puncture.

No. 5.—No adherence of gut to anterior abdominal wall, but abscess ¼ in. × ¼ in. on surface of gut at site of puncture and abscess ¼ in. × ¼ in. on posterior surface of anterior abdominal wall under incision. Some injection of pelvic peritoneum but no adhesion. A few tiny flakes of lymph on posterior surface of anterior abdominal wall on right side, and two small flakes on anterior surface of left lobe of liver.

No. 6.—Gut adherent to abdominal wall at site of puncture over area 1 in. × ¾ in. No abscesses, no lymph, no adhesion of gut to gut and no peritonitis.

No. 7.—Gut adherent to abdominal wall at site of puncture where an abscess ¾ in. × ¼ in. was surrounded by zone of local peritonitis 1 in. × 1½ in. Mesentery of a coil of gut in this zone rather injected. Elsewhere no peritonitis, no adhesions and no abscesses.

No. 8.—Gut not adherent to abdominal wall, but under incision there was an abscess ¼ in. × ¼ in. which had discharged through wound. At site of puncture very slight reaction and piece of catgut still undissolved; mesentery of one coil of small gut in contact with this rather injected, but no adhesion there or elsewhere and no distant abscesses or peritonitis.

No. 9.—No adhesion of gut to abdominal wall. Inflammatory reaction on posterior surface of anterior abdominal wall under incision and at site of puncture, where localised peritonitis ¼ in. × ¼ in. Nothing else abnormal found.

ORAL SULPHANILAMIDE

No. 10.—Gut adherent to abdominal wall over site of puncture. No abscess there, but much adherence of gut to gut with nodules of lymph. Many distant small abscesses with obstructive adhesions and peritonitis. Whole of small gut and its mesentery injected.

No. 11.—Gut adherent to abdominal wall over area 1 in. × ¾ in. and small gut adherent to large and obstructed in this area. Injection of mesentery of this coil of small gut. A few scattered small abscesses elsewhere, and in region of pylorus gut firmly adherent to gut with much injection of mesentery of small gut.

No. 12.—Obvious general peritonitis and intestinal obstruction. Multiple small abscesses ¼ in. × ¼ in. connected by strings of mucopus across general peritoneal cavity. Gross dilatation of one coil of gut which was deep purple.

TABLE I: SECOND EXPERIMENT

FINDINGS AT AUTOPSY A WEEK AFTER PUNCTURE AND CLOSURE OF CÆCUM AND SOILING OF RIGHT SIDE OF ABDOMINAL CAVITY WITH CÆCAL CONTENTS

Treatment	Rabbit no.	Lesions at site of puncture into cæcum		Lesions in or under incision		Lesions elsewhere in peritoneal cavity			
						Localised			Evidence of spread to general peritoneal cavity
		Abs.	Ad.	Abs.	Ad.	Abs.	Ad.	Obs.	
None	1	–	+	–	+	+ +	+ +	–	Injection of mesentery of small gut
	2	+ +	–	–	–	+ +	+	–	
	3	+ +	+ +	+ +	+ +	+ +	+	–	General peritonitis
Intraperitoneal sulphanilamide 300 mg./kg.	4	–	+	–	+	–	–	–	None
	5	+	–	+	–	–	–	–	None
	6	–	+	–	–	–	–	–	None
	7	+	+	–	–	–	–	–	None
	8	–	–	+	–	–	–	–	None
	9	–	–	–	–	–	–	–	None
Oral sulphanilamide 300 mg./kg.	10	–	+ +	–	+ +	+ +	+ +	+	Injection of mesentery of small gut
	11	–	+ +	–	+ +	+ +	+ +	+	
	12	+	+	+	+	+ +	+ +	+ +	General peritonitis

Abs. = abscess; Ad. = adhesion; Obs. = obstruction.

The only organism which could be grown from the abscesses or from the peritoneal fluid was a pure culture of *Bacillus coli*.

CONCLUSIONS FROM SECOND EXPERIMENT

The conclusions which may be drawn from these experiments are:—

(1) Liberation of intestinal contents into the peritoneal cavity of a rabbit is followed by the development of a plastic peritonitis, the causative organism of which is the *B. coli*. It is characterised by abscesses and areas of adhesion of gut to gut and gut to abdominal wall which may produce intestinal obstruction. If localisation is poor general peritonitis may result. The post-mortem finding in the rabbit exactly parallels the findings at operation or autopsy on patients with peritonitis.

(2) The injection of sulphanilamide into the peritoneal cavity at the same time as the contamination with intestinal contents prevents the development of this peritonitis, the pathological changes in the rabbits so treated being limited to a localised reaction in the immediate vicinity of the puncture in the gut and the abdominal incision.

(3) The administration of sulphanilamide by mouth in one dose of 300 mg. per kg. body-weight at the time of operation has no effect on the development of this peritonitis.

The experiments described deal only with contamination of the peritoneum with gut contents in the absence of intestinal obstruction. We have pointed out that if the gut has to be opened at an operation for acute intestinal obstruction the prognosis is very poor, because there is a great probability that a type of fatal peritonitis will develop which is an exact parallel to that we have produced experimentally in the absence of obstruction. It seems likely that the prognosis in this type of case may be considerably improved by the use of intraperitoneal sulphanilamide, while the not uncommon complication of an abscess in the wound may be rendered less likely by the use of sulphanilamide implanted in the deeper layers of the incision.

THIRD EXPERIMENT

It remained to be seen whether this *B. coli* peritonitis did in fact occur frequently after a gut resection in an experimental animal, and if so whether it could be

TABLE II—THIRD EXPERIMENT. Operation: resection of part of terminal ileum; ileo-cæcostomy

Treatment	Rabbit no.	Killed or died	Post-mortem findings			
			Wound	Anastomosis	Peritonitis	
					Local	General
None	13	D. in 36 hrs.	..	..	..	+ + + (Culture: *B. coli*).
	14	K. after 3 wks.	Adherent to gut.	Patent. Inflamed.	Abscess 1 × ½ in. at blind end.	+ +. (Culture: *B. coli*.)
	15	K. after 3 wks.	Abscess 2 × 2 in. discharging through wound.	Patent. Much inflammation.	Blind end covered with lymph, adherent to small gut.	+ +. A few small abscesses. Gut adherent. (Culture: *B. coli*.)
	16	D. in 36 hrs.	..	..	..	+ + +. (Culture: *B. coli*.)
	17	K. after 3 wks.	Abscess 2 × 1 in. in and behind wound.	Patent but surrounded by peritonitis.	Abscess ½ × ½ in. round blind end with much adhesion of gut.	+ + involving small gut, mesentery and omentum. (Culture: *B. coli*.)
	18	K. after 3 wks.	Gut adherent to abdominal wall behind wound.	Patent but surrounded by peritonitis.	Abscess ½ × ½ in. round blind end, with much adhesion round it.	+ + involving small gut, mesentery and omentum. (Culture: *B. coli* and *Staph. albus*.)
Intraperitoneal sulphanilamide, 300 mg./kg.	19	K. after 3 wks.	Normal.	Patent; pin's head abscess on suture line.	None at blind end.	None.
	20	K. after 3 wks.	Normal.	Patent, not inflamed.	Inflammation round blind end. (Culture: *B. coli*.)	None.
	21	K. after 3 wks.	Abscess 2 × 1 in. in and behind wound. (Culture: *Staph. aureus*.)	Patent.	Blind and adherent to wound.	No general spread.
	22	D. in. 36 hrs.	..	..	..	+ + +. (Culture: *B. coli*.)
	23	D. in. 36 hrs.	..	..	..	+ + +. (Culture: *B. coli*.)
	24	K. after 3 wks.	Normal.	Patent. One flake of lymph on suture line.	Blind end not inflamed.	None. (Culture sterile.)

prevented or modified in the same way by intraperitoneal sulphanilamide. In these experiments the animal used was again the rabbit. End-to-end or side-to-side anastomosis after a resection of small gut was found to be technically difficult, owing to the extremely small size of the gut. The first few rabbits in which this was the technique adopted all died rapidly of obstruction or leakage at the anastomosis. Ultimately, it was found much simpler to resect several inches of terminal ileum, close the lower end, and implant the upper end into the cæcum. This was our standard procedure in 12 rabbits. In 6 of them the operation concluded with the intraperitoneal injection of a suspension in saline of 300 mg. per kg. of sulphanilamide. The other 6 received no sulphanilamide. After three weeks all the surviving rabbits were killed and a note was made of the signs of inflammation in the wound, at the anastomosis, at the blind end and in the general peritoneal cavity. Cultures were taken from each case.

Of the 12 rabbits, 4 died within 36 hours of operation of general peritonitis, the *B. coli* alone being grown from the peritoneum in every case; 2 had received sulphanilamide, 2 had not. The remaining untreated rabbits (4) developed inflammation in the wound, at the anastomosis and at the blind end, as well as widespread peritonitis. It was remarkable to note the degree of peritonitis compatible with survival in the rabbit; the organism in every case was the *B. coli*. Of the 4 surviving rabbits treated with sulphanilamide, 2 had insignificant local lesions and nothing else; in 1 there was considerable inflammation round the blind end of the ileum, from which region *B. coli* was grown, and one had a large abscess posterior to the wound, giving a growth of *Staph. aureus*. In none of these 4 was there any general peritoneal spread. These results are shown in table II.

We next tried to assess the value of intraperitoneal sulphanilamide when a coil of strangulated and gangrenous gut is resected. Strangulation with gangrene was easily produced in rabbits by bringing a coil of gut through the linea alba, closing the incision round the gut and suturing the skin over it. Unfortunately, the subsequent resection of the gut proved to be far more lethal than we had hoped. Only one of many operated on survived more than 24 hours. It is noteworthy, however, that this rabbit, which received no sulphanilamide, lived for 9 days and died of *B. coli* peritonitis with many adhesions and several sites of obstruction. The high fatality in rabbits suggests that further experiments on these lines might usefully be performed on animals better able to stand the immediate hazards of operation. Nevertheless, granted that the bacterial content in strangulated gut is higher and the organisms are more virulent than in normal gut, they are the same organisms and cause the same type of peritonitis. It follows that any prophylactic measure which will prevent or modify *B. coli* peritonitis after resection in the absence of gangrene will have a similar value in cases of resection of gangrenous gut.

CASE-RECORDS

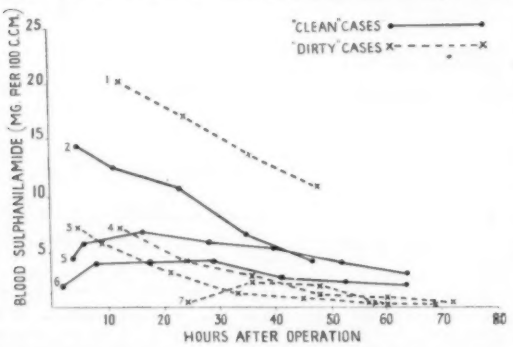
During the course of these experiments we had the opportunity of using intraperitoneal sulphanilamide in 2 cases in which a resection of small gut for acute obstruction was necessary.

CASE 1.—A man of 67 was admitted with signs, symptoms and radiological evidence of acute obstruction of the terminal ileum. Operation by one of us (R. S.) revealed a new growth which had almost obliterated the lumen of the gut. Resection of 11 in. of ileum was followed by the performance of an end-to-side anastomosis with an ileostomy just proximal, and 10 g. of sulphanilamide suspended in saline was left in the peritoneal cavity. Postoperatively continuous gastric suction ensured that depression of peristalsis should not lead to distension of the gut. Convalescence was complicated by the development of *B. coli* abscess in the wound, but from the first day the physical signs and symptoms, the study of the fluid-balance chart and routine straight radiograms of the abdomen demonstrated that the anastomosis was patent and that there was no hold up anywhere along the small gut. Five weeks after operation the patient died suddenly from a massive hæmatemesis from an œsophageal varix caused by

back pressure from secondaries in the liver, and at autopsy the line of anastomosis was already nearly invisible and there was no evidence of past or present peritonitis or adhesion.

CASE 2.—A woman of 62 was admitted with a strangulated femoral hernia of 30 hours' duration, vomiting, distended, but with only moderate signs of toxæmia. Operation (R. S.) disclosed 2 in. of gangrenous terminal ileum. Resection and side-to-side anastomosis with a proximal ileostomy were performed through a paramedian incision and 15 g. of sulphanilamide was inserted, 5 g. powdered around the anastomosis and ileostomy, 2 g. into the deeper layers of the wounds, and 8 g. suspended in saline in the peritoneal cavity. Postoperatively, continuous gastric suction was again employed, and a high concentration of blood sulphanilamide was maintained by the postoperative administration first into an intravenous drip and later by intramuscular injection of sulphapyridine. After 8 days the physical signs, the fluid-balance chart, and straight radiography showed that there was no hold-up at the anastomosis or elsewhere, and the ileostomy drainage for 24 hours diminished to 3 oz. Gastric suction was stopped and the ileostomy tube was removed. The patient was transferred to a convalescent home with both wounds firmly healed 13 days after operation.

It is unwise to draw conclusions from only 2 cases, but we do feel that it is encouraging that the first patients



treated with intraperitoneal sulphanilamide should escape completely the peritonitis which we know is so common.

Sulphanilamide, used as described above, constitutes a prophylactic but not a therapeutic measure. We do not yet know whether or not it can have a therapeutic action in cases of established peritonitis. We have, however, used intraperitoneal sulphanilamide in a number of cases other than acute obstruction with the object both of assessing a possible therapeutic value and of investigating the effect on the concentration in the blood of sulphanilamide. The following cases were treated by the injection of sulphanilamide into the peritoneal cavity at the conclusion of operation:—

1. Pancreatic abscess, drained by a tube through the gastro-colic omentum and traversing the peritoneal cavity (organism, *B. coli*).
2. Perforated appendix with free pus in the peritoneal cavity (organism, *B. coli*).
3. Appendix abscess, poorly localised, with free pus in the peritoneal cavity (organism *B. coli*).
4. Perforated gastric ulcer of 19 hours' duration, with considerable contamination of the peritoneum by gastric contents.

Uneventful recovery followed in 3 cases. The patient with the pancreatic abscess died; this was not remarkable since prior to surgery she was also contending with portal pyæmia, diabetic coma with renal failure, and bilateral bronchopneumonia; at autopsy she was found to have severe mitral stenosis. In each case the blood sulphanilamide was estimated after the operation at intervals up to 72 hours.

In order to compare the rate of absorption from normal peritoneum, sulphanilamide was introduced at operation into the peritoneal cavity in the following clean cases:—

1. Strangulated hernia without gangrene.
2. Partial gastrectomy.
3. Cholecystectomy.

The dose in every case except one was 10 g. suspended in saline; the case with the pancreatic abscess was given 15 g. The figure shows the levels of blood sulphanilamide in these 7 cases from the time of operation up to 72 hours. The rate of absorption varied considerably from case to case, but there was no obvious difference between the absorption in clean and contaminated cases.

SUMMARY

Analysis of 670 consecutive cases of acute intestinal obstruction showed that the fatality-rate in cases where simple release could be practised was 6·7%, whereas the rate was 77·4% when resection was necessary.

The high fatality in cases in which the gut has to be opened, whether for resection, anastomosis or enterostomy, is mainly attributed to a postoperative plastic peritonitis leading to mechanical obstruction.

The causative organism of this plastic peritonitis is the *B. coli* and the peritoneum is infected by contamination with gut contents when the gut is opened at operation.

Experiments with rabbits demonstrated (1) that sulphanilamide introduced into the peritoneal cavity was well absorbed and caused no local inflammatory reaction; (2) that contamination of the peritoneal cavity with contents of the cæcum produced a plastic peritonitis with the formation of abscesses and adhesions, and sometimes general peritonitis; (3) that this plastic peritonitis could be prevented by introducing sulphanilamide into the peritoneal cavity at the time of the contamination, but not by a single large dose of sulphanilamide given at that time by mouth.

Further experiments with rabbits showed (4) that *B. coli* peritonitis followed resection of gut with great regularity; (5) that prophylactic use of intraperitoneal sulphanilamide usually reduced, and in some cases even eliminated, the inflammatory process; but (6) that in the presence of a fulminating infection intraperitoneal sulphanilamide in the doses which we employed was valueless.

So far 2 cases of resection of gut for acute intestinal obstruction in man have been treated with intraperitoneal sulphanilamide. In neither of these was there any postoperative obstruction or peritonitis, local or general.

Our thanks are due to Prof. James McIntosh for providing us with the facilities to carry out these experiments in the Bland-Sutton Institute of the Middlesex Hospital, as well as for his counsel and interest.

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PRESERVATION OF BLOOD FOR SUGAR ANALYSIS

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Dr. E. J. King and his colleagues have lately described a simple method for preventing glycolysis (*Lancet*, March 8, 1941, p. 310). For those who use the common Folin-Wu method or modifications the following is of interest and value as preservation is ensured without any extra solutions or manipulations. After the collection of 0·1 or 0·2 ml. of blood into water and the usual precipitation of proteins by 2/3N. H_2SO_4 and 10% sodium tungstate, the resultant mixture can be left safely up to a week at room temperature without any change in sugar content, which is often very convenient in war-time delays. The following figures show this:

Days	Sugar mg. per 100 ml. in Sample 1	Sample 2
1	218	69
3	206	72
5	215	72
7	206	61

These figures show minor variations of no practical magnitude which are due to war-time difficulties with heating apparatus. I have found that the preservation of sugar in whole blood by fluoride is shorter and lasts only 2–3 days.

I wish to express my thanks to Mr. H. R. Millar for these estimations.

TREATMENT OF BACTERIAL ENDOCARDITIS WITH HEPARIN AND SULPHAPYRIDINE

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Kelson and White in America (1939) seem to have been the first to suggest and use heparin to reduce the coagulability of the blood in infective endocarditis, their aim being to prevent deposition of fibrin on the vegetations on the heart valves, and thus to deprive the organisms of the defence offered by it; they also suggested the use of sulphapyridine to augment the antibacterial power of the blood. Cases submitted to this treatment have been described by Friedmann and others (1939) in America and by Witts (1940) and Fletcher (1940) in England.

TECHNIQUE

Two cases were treated; in one, heparin infusion was given on two occasions. Sulphapyridine was given before the commencement of the heparin infusion in both; in one it was given concurrently with the heparin. Dosage started with 2 g., thereafter 1 g. was given four-hourly for four days, 1 g. four times daily for four days and 1 g. thrice daily for two days. Heparin was employed in the form of Liquemin (Roche) in solution of 5 mg. per c.cm. Blood-coagulation time was measured by the method of Lee and White, as described by Whitby and Britten (1937). The patient's leg was fixed in a Thomas splint; a gold cannula tied into the internal saphenous vein with silk ligature, and the drip infusion started with normal saline. Not more than 1½ litres of fluid was given by the drip per day. The rate of 42 c.cm. per hour can be maintained by regulating a Baxter drip at about 16 drops per minute. The heparin is added in solution to the normal saline in the flask. In this way the number of mg. of heparin per hour can readily be adjusted without altering the rate of the drip, and the clotting-time closely watched; this was observed three or four times during the 24 hours. Heparin, 15–20 mg. per hour, was found to raise the clotting-time to many times its resting value in one case; in the other it only doubled or trebled it. It seems sufficient to raise the clotting-time to half an hour, though some workers recommend an hour or more. The treatment should be carried on for 10–14 days. Among the technical difficulties is that of maintaining a constant slow rate of drip. This may need to be regulated at least every ½ hour, and for this the coöperation of the nursing staff is essential. Because of its antihæmorrhagic properties vitamin C in the form of ascorbic acid 50 mg. thrice daily was given throughout.

CASE-HISTORIES

Case 1.—A moulder, aged 28, was admitted to hospital on July 9, 1940. He gave a history of influenza three weeks previously and being in bed since, with weakness, malaise and sweating particularly at night; past illnesses included "rheumatics" at 15 years and 3–5 attacks of influenza. He was pale, with a peculiar yellow tinge in his face; skin warm and moist; rather wasted; temperature 100·5° F.; pulse-rate 120, regular, Corrigan type; clubbing of fingers with increased curvature of nails. On July 10 his urine contained albumin and urobilin, a few pus cells and red cells; no organisms. On July 12 he was seen to have petechiæ under the nails and on the abdomen; intermittent temperature between 98° and 102° F. Spleen not palpable, but splenic dullness increased in area. Heart enlarged to the left; localised presystolic mitral murmur, and pulmonary second sound accentuated. Blood-pressure 130/70. The second sound soon became reduplicated in the mitral area and later a diastolic murmur appeared outside the apex-beat. On the 22nd his presystolic murmur had spread towards the tricuspid valve and there was an added systolic murmur at the apex. Blood-count on July 12 gave red cells 3,200,000; Hb. 56%; white cells 18,600; polymorphs 82%. Blood-cultures on July 10 and 15 gave short chained gram-positive streptococci showing neither α nor β hæmolysis.

A ten-day course of sulphapyridine was begun on July 15; his temperature came down and remained below 99° F. until the 22nd. Pulse varied between 80 and 120, averaging about 100. On July 19 blood-culture was still positive. A course of ascorbic acid was begun on July 22, and the intravenous heparin drip set up. Blood-coagulation time before this treatment was 5¾ min. In the first 24 hours he received 1 litre of saline, and about 230 mg. heparin (about 10 mg. per hour). Blood-coagulation varied between 6 and 6½ min. The temperature rose to between 100° and 101° F. on the 22nd, and next day to 104·3° F.; pulse-rate rose to 160 and he developed a dry, painful, irritating cough with pain in right chest. A pulmonary embolism was diagnosed, but in spite of this the treatment was continued, and in the next 18 hours about 360 mg. of heparin was given (about 20 mg. per hour). The clotting-time rose to 8½ min. and later to 10 min. On the morning of the 24th the patient was seized with acute œdema of the lungs and died.

Autopsy.—Numerous white infarcts in spleen and kidneys. No microscopic evidence of nephritis. Embolus in right pulmonary artery and severe œdema of right lung; microscopically, the lungs showed œdema and heart-failure cells. Brain normal. Liver friable and brownish-yellow; microscopically, the liver cells were degenerate and the whole liver infiltrated with round cells, largely periportal in distribution. Heart showed vegetations on mitral and tricuspid valves; mitral valve stenosed. Vegetations small, brownish and friable, and not abundant; microscopically, fibrosis at base of vegetations, some fibrin on the surface; no organisms seen. Urine: no red cells or casts: film showed scanty streptococci.

Case 2.—A man admitted on June 15, 1940, complaining of tiredness, malaise and sweats. He gave a history of "influenza" in March with lassitude and pains in the legs, and was in bed for a month. Returned to work (as a turner) for a week but had not been well since. Before admission had œdema of his ankles but no dyspnœa. He was a well-built man but had recently lost weight; yellowish tinge to skin; no Osler's nodes; no clubbing of fingers. Slight œdema of ankles present which soon disappeared. Purpuric spots on legs which faded in a week. The temperature irregularly intermittent from 97°–99° F. to 100°–102° F. Pulse-rate varied between 80 and 100; regular, full and collapsing. Liver and spleen never palpable. On July 2 he had a sudden severe attack of pain over the splenic area and a friction rub developed. The heart was normal in size. At first there was a loud systolic murmur at the apex transmitted outwards and the pulmonary second sound was accentuated. On June 27 a localised mitral presystolic murmur was added and later this became generalised. Urine: heavy albuminuria every day; film showed numerous casts and red cells; deposit contained streptococci, hyaline and granular casts. Blood-urea 50 mg. per 100 c.cm.; urea clearance low normal. Blood-picture showed a slowly progressive normochronic anæmia, and a polymorphonuclear leucocytosis. Blood-culture: several positive cultures obtained of a gram-positive non-capsulated, non-motile, short-chain streptococcus giving neither α nor β hæmolysis on blood-agar.

On July 3 a ten-day course of sulphapyridine was begun. Within 24 hours the temperature was normal, but on the night of the 10th it rose to 102·2° F. Blood-culture was positive on July 4; on the 11th a course of vitamin C was begun. The intravenous heparin drip was set up on July 12; clotting-time then 4½ min. In the first 20 hours patient received less than ¾ pint of saline and 100–120 mg. heparin (5–6 mg. per hour). The clotting-time was 9, 10 and 9½ min. at various times that day. The rate of the drip was then doubled, giving about 1 litre of saline in the next 24 hours, and 10–12 mg. heparin per hour. As the clotting-time was still only 10 min. the heparin was increased to 16 mg. per hour in the evening of the second day. This rate was maintained for the next 36 hours, and on July 14 clotting-time was longer than 5 hours. All this time the patient appeared better, with a pulse-rate between 80 and 100. The first two days his temperature was normal; on the third day it rose to 101° F.; and on the fourth he had a rigor and it went up to 103° F. Soon air-hunger developed, then coma and in 2–3 hours a left hemiplegia was found. Treatment was discontinued after 72 hours. The patient regained consciousness, but developed œdema of his ankles. This increased and spread to legs, face and back. Urine still contained red cells and streptococci. The hemiplegia gradually passed away, and by July 30 muscular power was almost normal, but the mitral presystolic murmur became diffuse and pulse-rate averaged 100. The intravenous heparin drip was recommenced on July 31 and sulphapyridine given concurrently. Vitamin C was given as before. Blood-coagulation time before treatment was 3 min.

The drip was begun at 10 mg. in 42 c.cm. of saline per hour. Two hours later the temperature rose from 101° to 104° F. and the patient had a rigor lasting an hour. The clotting-time varied between 9, 11½ and 9½ min. that day; the temperature remained up at 102° F. Next day the patient seemed better, and his facial œdema disappeared. The coagulation-time remained at about 10 min. that day, and the heparin was then increased to 20 mg. per hour. His urine still contained red cells and streptococci. Blood-count: red cells 2,200,000; Hb 40%. Blood transfusion of 1 pint was given the next day. The clotting-time was then 21½ min.; patient was visibly improving; presystolic murmur again localised; blood-culture still positive; heparin maintained at 20 mg. per hour. On Aug. 3 condition the same, but the clotting-time fell to 10 min. and later rose to 14 min. That evening there was a sudden change; coma came on rapidly; eyelids and right arm twitched and he died later that night. The course of treatment lasted 80 hours.

Autopsy.—Heart of normal size; fibrous stenosis of mitral valve. Small brownish vegetations attached to cusps on ventricular surface near free border of valves: also attached to chordæ tendineæ, but endocardium not involved, and major area of valves free. Microscopically, vegetations showed fibrosis at their bases, some fibrin near surface, and numerous streptococci in deeper layers of fibrin. Lungs: free fluid in both pleural sacs; pulmonary œdema and brown induration present; microscopically, alveolar walls congested and alveolar spaces full in many places with red cells and heart-failure cells. Liver normal in size, colour and consistence; microscopically, cloudy swelling and degeneration of liver cells with some leucocytic and round-cell infiltration between liver cells. Spleen enlarged to three times normal size; two large, white infarcts near surface; microscopically, congested otherwise structure normal. Kidneys, both enlarged and somewhat pale; typically "flea-bitten"; microscopically, diffuse glomerulonephritis showing glomeruli in subacute and chronic stages of inflammation, but none in acute hæmorrhagic stage; in the lumina of tubules red cells present, and in others hyaline casts. Brain: large area of softening involving under surface of right occipital lobe, superior temporal lobe, and internal capsule; no hæmorrhage; no embolus found; microscopically, degenerated area infiltrated with pus cells and round cells near cortical surface.

DISCUSSION

Outstanding features of these two cases are the deaths of both patients from embolism, in one pulmonary and the other cerebral; the rapid clinical improvement in case 2 during both courses of treatment before the embolism; and the appearance of the valvular vegetations, which were much smaller than is usual and contained less fibrin. In case 1 no organisms were seen microscopically on the vegetations. Neither case underwent a full 10–14 day course of treatment; had this been possible the results might have been different. The treatment is undoubtedly highly dangerous; Kelson and White, and Witts and Fletcher have reported cerebral accidents similar to those in the two cases reported here. The treatment nevertheless seems justifiable for what is invariably a fatal disease.

I wish to thank Dr. S. C. Dyke and Dr. M. B. Baines for permission to publish these cases. Dr. Dyke also helped me in the treatment of the cases and in drawing up this report.

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SENSITIVITY TO CARROTS.—Now that carrots are to take a more prominent place in our dietary, whether as a vegetable or as a diluent for marmalade, we may hear more of them as an occupational hazard. H. R. Vickers (*Brit. J. Derm.* February, 1941, p. 52) reports seven cases of dermatitis in girls employed in the canning of carrots. Sensitisation did not develop until they had been handling raw carrots for some time. Vickers did not identify the responsible constituent, but he decided that it was not the essential oil. Thus another substance has been added to the ever-growing list of skin sensitisers.

FAILURE OF HEPARIN IN SUBACUTE BACTERIAL ENDOCARDITIS

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SINCE Kelson and White (1939) first described the treatment of subacute bacterial endocarditis with sulphapyridine and heparin several other cases treated by their method have been recorded.

Witts (1940), Fletcher (1940) and Miller (1940) have reported cases which died of cerebral hæmorrhage during the treatment. Petch (1940) reported 2 such cases and 1 dying of toxic jaundice. Sevitt (1941) treated 2 cases which died of embolism (pulmonary and cerebral) during the treatment. Klieber (1940) reported a case in which treatment had to be stopped owing to hæmaturia. The only successful cases were 1 of Petch's (well for six months) and 1 of Weeks's (1940), but in the latter the diagnosis was not proved. Thus it is clear that treatment with heparin carries with it a serious risk of cerebral and other vascular accidents, and it was in view of this that I suggested (Fletcher 1940) that it should only be given to cases in which there were no embolic signs.

Swain (1940) suggested that, before heparinisation is embarked on, the infecting organism should be shown to be susceptible to chemotherapy in vitro. If, however, heparin acts in the way postulated by Kelson and White it should be effective in the absence of sulphapyridine, for the blood of patients suffering from subacute bacterial endocarditis is known to be rich in antibodies to the infecting organism; if heparin can abolish the bacterial breeding ground the patient's blood should be capable of dealing with the circulating bacteria. The essential question is whether heparin, given intravenously for 14 days in dosage sufficient to prolong the clotting time by four or five times its usual length, does or does not inhibit the formation of vegetations on the valves of the heart. This information has been provided recently by a case treated with heparin alone, in which the patient died on the 14th day of heparinisation. It was thus possible to observe the valves at the completion of treatment.

CASE-HISTORY

A housewife, aged 40, had had rheumatic heart disease in childhood. She had coryza and a dental extraction 4 months before admission and since that time had felt unwell; 3 months before admission she found herself feverish. At this time she noticed painful spots at the tips of her fingers for a few days, became breathless on slight exertion, and had some swelling of her ankles. From that time until her admission she remained in bed, being continuously febrile but not feeling particularly unwell.

When examined on Nov. 19, 1940, she was pale and slightly sallow. She had many flat pigmented spots all over her body, some of which she said had been present since childhood, but some she thought had appeared since her present illness. No recent petechiæ were seen on this or any subsequent occasion. There was clubbing of the fingers and a palpable spleen. Cardiac enlargement was moderate; murmurs indicating mitral stenosis and aortic regurgitation were present. Blood-count: red cells 3,130,000, Hb. 60%, white cells 5800. No red cells were found in the urine. Blood-culture showed a *Streptococcus viridans*; this organism was tested for susceptibility to sulphapyridine and sulphathiazole by Mr. R. L. Vollum, D.Phil., who found that it grew readily in blood when a concentration of 50 mg. per 100 c.cm. of either substance was present.

In view of her good general condition and absence of embolic signs the patient was considered to be suitable for heparin therapy. Since her infecting organism was not susceptible to chemotherapy it was decided to try heparin alone. Liquemin (Roche) was used. The powder was dissolved in normal saline in a strength of 1 mg. per c.cm. This standard solution was then diluted with normal saline for the actual infusion according to the needs of the patient. The total volume of saline given daily was restricted to 1 litre. The infusion was started on Dec. 4 and was continued for 14 days. Throughout this period 300 mg. of ascorbic acid was given daily after an initial course of 1000 mg. daily for 3 days. For the first 2 days clotting times (Lee and White)

were estimated twice daily ; subsequently they were estimated daily. These clotting times and the dosage of heparin for each period between estimations are given in the table. It will be seen that the clotting time remained at or above four times its normal value except on the 5th day, when the vein

Date in Dec. 1940	Dose of heparin (mg. per hr.)	Clotting time (min.)	Date in Dec. 1940	Dose of heparin (mg. per hr.)	Clotting time (min.)
3	..	6½	9	8·3	9
4	..	6½	10	7	28
5 A.M.	4	8½	11	7·8	25
5 P.M.	8	28	12	13	48
6 A.M.	10	77	13	13	50
6 P.M.	10	50	14	10	31
7	6·7	55	16	11·3	50
8	9·2	31	17	12·5	51

through which the heparin was being given became occluded and the infusion was stopped for a few hours. On the 12th day the patient complained of slight headache and mistiness of vision in the left eye. The next day this was worse, and on the morning of the 14th day she rapidly became comatose and died. The heparin infusion was stopped 6 hours before death. Throughout the period of treatment the patient's temperature swung between 99° and 101° F. There were no rigors.

At autopsy there were small bilateral pleural effusions ; the lungs were œdematous with some hypostatic pneumonia. There was a small pericardial effusion ; the heart weighed 390 g. and was dilated on the right side. There was slight stenosis of the tricuspid valve with no vegetations ; the mitral orifice was narrowed by old rheumatic infection. There were numerous large friable vegetations on the valve surface, the chordæ, and the wall of the left auricle. The left ventricle and aortic valves showed no change. The spleen weighed 616 g. and showed old and recent infarcts. The kidneys contained a number of old infarcts. The brain showed an extensive subdural hæmorrhage on the right side, evidence of old subarachnoid hæmorrhage, and a mass of blood-clot exuding from the right occipital pole which arose from a hæmorrhagic cavity in the white matter. There were also a few cortical hæmorrhages in this region. There were no other gross abnormalities.

Microscopically, the mitral valve and auricular endocardium presented the typical appearances of subacute bacterial endocarditis and differed in no recognisable way from those seen in untreated cases. There was evidence of old rheumatic scarring in the myocardium and valves. The mitral valve was vascularised, and on the auricular surface near the point of closure there were bacterial vegetations covered with a fibrin thrombus and lying on a granulation-tissue base. Much of the fibrin appeared to be of recent deposition. In the brain, near the hæmorrhage, there was considerable proliferation of the capillary endothelium, and ring hæmorrhages but no thrombi were detected.

SUMMARY

Heparin treatment of subacute infective endocarditis carries with it a risk of cerebral and other vascular accidents.

A case is reported in which heparinisation was adequately maintained for 14 days, the patient then dying of cerebral hæmorrhage.

At autopsy the vegetations in the heart were in no way different from those seen in untreated cases. There were recent depositions of fibrin and no signs of healing. It may be concluded that the heparin treatment of subacute bacterial endocarditis is both dangerous and ineffective.

I wish to thank Prof. L. J. Witts for his advice and his permission to publish this case, and Dr. A. H. T. Robb-Smith for his report of the autopsy.

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CALCIFICATION IN MUSCLES OF FOREARM

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IN October, 1917, a patient sustained a severe gunshot wound of the right upper arm ; much of the deltoid muscle was torn away and the humerus was fractured at this level. He was lying out in the field for two days before he was brought to a casualty clearing station where the wound was cleaned up, the arm splinted on a hinged wooden elbow-splint with the elbow flexed to 90°, and the arm bandaged to the side of the chest. After about a week an operation was carried out on the wound, and a plaster was applied from the knuckles to the middle of the upper arm, with the elbow flexed to a right angle. This plaster was applied (the patient says) because the wrist had dropped during the week immediately following the accident. He remembered no pain, swelling or numbness of the forearm or hand but, as he says, he was so ill during the first week that the statement has little value. The gunshot wound became infected and two years later was still discharging pus, while the patient himself showed evidence of amyloid disease. By the end of the third year the wound had healed satisfactorily with union of the humerus ; shoulder movements were improving, elbow movements were returning, but pronation and supination of the forearm were almost absent and the wrist was fixed in flexion. Some finger movements were possible. In 1922 the electrical reactions showed no response to faradic stimulation of the dorsal interosseous nerve, but the median and ulnar nerves responded normally. A radiogram of the wrist showed no abnormality.

FIG. 1—Position of wrist and fingers.

We saw him in July, 1940, when he was a healthy man, aged 47 years, working as a cycle engineer. He complained of a recent attack of pain in the right forearm. The scar of the upper arm was soundly healed and was not tender or abnormal. The forearm was considerably wasted, and the skin of the back of the wrist and hand was thin and shiny. The shoulder could be abducted against gravity to beyond a right angle despite great loss of the deltoid muscle. The elbow could be flexed and extended powerfully over a range of 45° to 135°. The forearm was held in a position midway between supination and pronation, and only about 10° of supination was possible. Some small hard nodules were felt among the wasted muscles of the forearm, but the majority of the calcified tissue shown in a radiogram was impalpable. The brachio-radialis muscle acted powerfully. The wrist was held flexed at 80° (fig. 1) and could be further flexed passively for a few degrees. No extension of the wrist was possible. All metacarpophalangeal joints were extended and held straight except the fourth, which was hyperextended. The interphalangeal joints were all flexed. The middle finger was strongly flexed. The thumb was held straight and adducted. Slight active flexion of all the fingers was possible and the forearm muscles could be seen contracting when this was carried out. No extension of the fingers was possible, and no flexion or extension of the thumb. Adduction and abduction were present in the fingers. There was no anæsthesia to light touch in the forearm and hand. The radial, brachial and axillary arteries pulsated normally, but the right hand was obviously colder than the left and its temperature was 22° C. as opposed to 29° C. of the left hand (room temperature 14° C.). Faradic stimulation of the median and ulnar nerves at the elbow gave normal reactions in the flexor muscles, but there was no response to faradic stimulation of the posterior interosseous nerve.

The patient thus had a partial radial-nerve lesion affecting the forearm extensor muscles. The forearm muscles of the flexor group were contracted and wasted but their nerve-supply was intact. The radiogram (fig. 2) shows that the muscle bellies of the flexor and extensor aspects of the forearm are infiltrated by calcium deposits which give an approximate rendering of the size and shape of the extensor indicis proprius, extensor

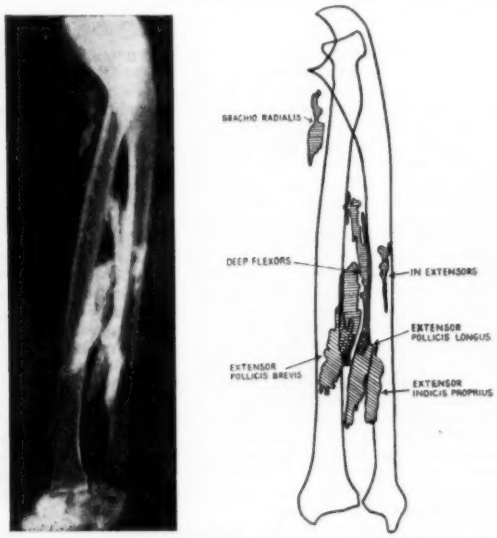

FIG. 2—Anteroposterior radiogram of forearm, with key.

pollicis longus and brevis, while other deposits are to be seen in the flexor digitorum profundus, flexor pollicis longus and in the radial extensors of the wrist. These deposits are apparently extra-periosteal. Radiograms of the upper arm and hand showed a united fracture of the humerus and disuse atrophy of the bones of the hand.

DISCUSSION

The most arresting feature of this case is the widespread deposition of calcium in the forearm muscles. The conformation of the deposits in the thumb extensors shows that the muscle-fibres have been largely replaced by calcium, and by analogy it is probable that the more irregular deposits have also originated in muscle. The paralysis of the dorsal interosseous nerve may represent a partial nerve lesion occurring at the level of the wound, or more probably an unusual sequel of an ischæmic paralysis of the Volkmann type. That such an ischæmia occurred is probable from the history and present condition of the limb, and it was doubtless due to some injury of the brachial artery. The distribution of the calcium deposits indicates that both flexor and extensor groups were affected by the ischæmia. Calcification of muscle after pure nerve injuries sustained in the last war was described by French writers and more recently by Voss,[1] but a radial-nerve lesion alone cannot be held responsible for the widespread deposits in this case. This ischæmic involvement of the extensor group differs from the usual account of Volkmann's contracture in which there is described a contracture of the flexors only. The extended posture of the metacarpo-phalangeal joints indicates that the extensors were affected by the ischæmia.

This case is an example of dystrophic calcification such as is found in old tuberculous glands, scars and other unabsorbed devitalised tissue; the muscle devitalised by ischæmia would also seem to be a likely site for the laying down of calcium.

We wish to thank Dr. Herbert Lightstone, director general of medical services, Ministry of Pensions, for permission to record this case.

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EPANUTIN AND ELECTRIC CONVULSION THERAPY

BY

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THE anti-convulsant properties of disodium diphenyl hydantoinate (Epanutin) were discovered experimentally by Putnam and Merritt (1938), who found that it remarkably raised the threshold for electrically induced fits in animals. The rise was often of the order of 100% or more while the effect of Luminal and bromide was much less striking.

Encouraged by these discoveries Merritt and Putnam (1939) tested the drug on epileptic patients and found a very satisfactory reduction both of major and of minor attacks even in patients who had been unresponsive to luminal. At the same time there was little or no hypnotic or depressant action, though in certain cases there were troublesome side-effects. The drug is now accepted as a valuable addition to our armoury against epilepsy. The pharmacology of the compound is still incomplete and the nature of its anticonvulsant action is quite obscure. Although resembling the barbiturates slightly in composition its action seems very different since it is not a cerebral sedative, and, from electro-encephalographic studies, it seems to affect the local epileptic abnormality rather than the tendency of the disturbance to spread over the cortex which appears to be the basis of action of luminal.

Acting on the suggestion of Dr. F. L. Golla that epanutin might act through improvement of the cerebral circulation, it was decided to try the effect of administering the drug to a series of patients suffering from a variety of mental disorders. There seemed a possibility that normal cortical function might be encouraged even in patients not liable to typical epileptic attacks. The results were irregular but not altogether unpromising. Pushing the dosage evoked side-effects, and the treatment was discontinued. At the same time a number of similar patients were being treated with convulsions induced by brief electrical stimuli; for accounts of the technique see Cerletti and Bini 1935, Golla, Fleming and Walter 1939, 1940, Shepley and MacGregor 1939, 1940, Walter 1940, Fox 1940. There seemed a possibility that a combination of this treatment with small doses of epanutin might produce good results. Moreover, although the results of the electrical treatment are excellent and accidents few, there are occasional mildly unpleasant transitory sequels, such as poorness of memory and orientation and sometimes considerable confusion. Since epanutin often has an excellent effect upon similar complaints in epileptics, it was decided to try the effect of the drug on patients undergoing electric convulsion therapy. It was known, of course, that the electric convulsion threshold was likely to be raised by this procedure, but the margin of safety in the electrical treatment is so great that dangerous consequences were not anticipated, even if twice the usual dose of current had to be given. As it turned out, this confidence was justified.

FIRST TRIAL

A group of six patients was selected for the first trial. They were all chronic schizophrenics with some degree of dementia and of fair physical condition. None presented any distinctive clinical features. Their respective ages, weights and lengths of history are given in fig. 1, which also shows the variation of threshold during and after the period of epanutin dosage. It will be seen that treatment was given three times a week.

In this series both voltage and duration of stimulus were varied to obtain a threshold. The voltage was set to an average value, usually 130 volts. The time switch was then adjusted to a fairly short duration, usually 0·2 sec. If a convulsion resulted immediately without latency the dosage was reduced slightly on the next occasion—for example, duration dropped to 0·15 sec. If there was a definite latency of more than 3 sec. the dose was taken as threshold and the same was given next time. If there was no convulsion

further increased doses were given until the result was obtained (e.g. 0·2 sec. at 135 volts, then 0·25 sec. at 135 volts, then 0·25 sec. at 140 volts and so on).

A sub-threshold shock raises the threshold to a subsequent one so that the true threshold, after a series of unsuccessful stimuli, is slightly lower than would seem likely from the effective setting. After the first determination of threshold the patient becomes slightly more fit-resistant each day, as with Cardiazol, but, as the curves show, the rise is slight and is most definite during the first few days. In several hundred other patients there was no continuous rise of threshold.

In the curves of fig. 1 the ordinate is the product of voltage and duration. It has been found that, on the whole, the cerebral-excitability curve for convulsions shows a constant quantity relation; if the duration is halved the current must be doubled to have the same effect, so that if in a series of test stimuli both time and strength are varied the product of the two can be regarded as a suitable quantity for plotting. The electrical resistance of each patient varies little from day to day so that the current was roughly proportional to the voltage. Moreover, resistance variations are mostly illusory, since the skin resistance, which provides nearly the whole of the measured resistance, disappears altogether with the strong current used to induce the convulsion. Measurement of the brief stimulating current itself is unreliable, since the power factor is uncertain; measurements with cathode-ray indicators have shown that the actual current passing can be assessed accurately by assuming in any given patient a proportionality with voltage.

The nature of the convulsion and of the recovery stages were noted on each occasion. On the 16th, 17th and 18th days three capsules of epanutin were given by mouth. As the curves show, the effect on the convulsion threshold was not visible for several days. Possible reasons for this delayed action and its clinical significance will be discussed later. The effect of the epanutin on the patients' mental state and on recovery from the convulsions cannot usefully be discussed until more observations have been made over a longer time. The cases selected for these preliminary trials were not of a type to give a very clear account of their feelings. This paper is concerned rather with the effect of the drug on the convulsive process and with the clinical inferences that can be drawn.

After the few days' latency the threshold rose considerably in all patients. In two of them the rise was so great that it became impossible to induce a convulsion at all. This is striking objective evidence of the protective power of the drug. A second series of doses was given on the 21st, 22nd and 23rd days. This time six capsules

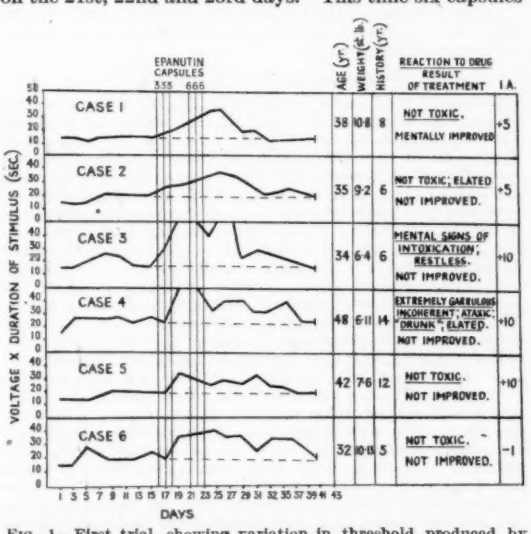

FIG. 1—First trial, showing variation in threshold produced by epanutin. Voltage and duration of stimulus were varied to obtain a threshold. I.A., impedance angle.

were taken every day, and after a few days they caused a second hump in the curves, but the effect was little greater than after the smaller doses. After this second peak the decline in threshold was very slow and irregular, some of the patients taking 14 days to return to the pre-dosage level. During the height of the drug-action

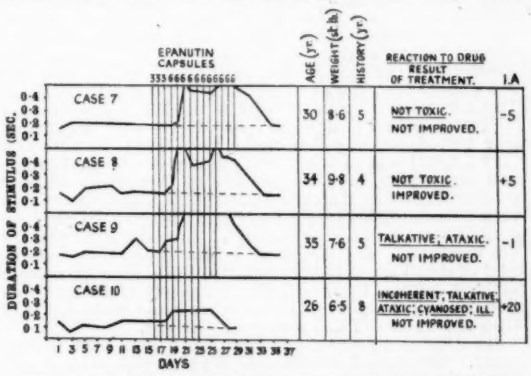

FIG. 2—Second trial. Voltage was kept constant except when threshold became extremely high.

period it was noticed that the convulsions in all patients were more ragged and variable in duration than usual; the tonic stage was often particularly abbreviated. Recovery was usually more rapid and mental confusion seemed less frequent. Two patients seemed intoxicated by the drug and one of them babbled incoherently, but there were only mild physical signs of epanutin intoxication.

SECOND TRIAL

A second series of four patients also undergoing electric-convulsion therapy was then selected for a further trial. They were of the same type as those in the previous group.

In these cases the voltage was kept constant, only the duration was varied, except when the threshold became extremely high and the maximum dosage was administered to prove complete resistance to convulsions. Fig. 2 shows the duration threshold changes, together with the physical features and responses of the patients. As in the previous series, there is a definite latency followed by a sharp and dramatic rise. Administration of epanutin was begun on the 16th day with three capsules daily, and from this day convulsions were given daily in order to observe the detail of the threshold changes. On the 19th day dosage was increased to six capsules daily and was continued for the varying periods shown on the curves. Again two of the patients became completely resistant to fits; one showed a 100% rise in threshold and the one with the poorest physique only a 50% increase. This patient also exhibited severe toxic symptoms—ataxia, increased cyanosis and confusion—and the drug was withheld on the 23rd day. In the other patients withdrawal was followed by a decline in threshold which reached the pre-dosage level in 4–7 days. In the first series the fall was much slower and it is tempting to explain this difference as an effect of the more frequent convulsions. In the second series the day-to-day fall in threshold after withdrawal was more rapid, but the decline after each convulsion was about the same as in the first series.

DISCUSSION

As the curves clearly show, the convulsion threshold was significantly raised in all the patients. In the smaller patients the rise was so great that no convulsion could be induced, nor in these cases was there any sign of cortical spread or persistence suggestive of an abortive epileptic process. This confirms the claims of Putnam and Merritt regarding the dramatic effects of the drug on animals. The other striking point is the delayed action of the drug. There is a latent period of 4–6 days, after which the effect develops rapidly to its maximum. On withdrawal there is an almost immediate but gradual decline, varying in rate apparently with the number of

convulsions. With these data alone no satisfactory explanation of the time relation of action can be given. There is unfortunately not yet any satisfactory test for epanutin in the blood or other body fluids, so that it is impossible to decide whether the shape of the time curve is due to delayed absorption, accumulation or to some slow cellular change. Evidently the dosage is even more critical than experience with epileptics would suggest, since the smaller patients show the greater effects, both protective and toxic. The dose of three capsules a day seemed to be about optimal, since doubling this dose did not double the effect but did aggravate the toxic signs. The one patient who showed a threshold rise of only 50% with several toxic signs (case 10) was very emaciated. Her impedance angle (Brazier 1933, 1934, Brazier and Grant 1934) was plus 20, well outside the normal range, and suggestive of some degree of hyperthyroidism.* It is conceivable that the raised metabolism associated with this condition might have something to do with the patient's apparent idiosyncrasy. In using epanutin for the treatment of epilepsy it seems likely that patient trial of small doses is necessary to obtain good fit-control without delayed toxic actions. In nearly all the patients discussed here the ataxia and other signs appeared well after the threshold had reached its height.

No drug can be properly used until it is fully understood. The action of epanutin is by no means clear and its application is therefore largely a matter of trial and error. In its effect on electrically induced fits we can see a suggestion of the manner in which it surpasses a sedative such as luminal. Electro-encephalography of essential epileptics shows that, whereas luminal limits to some extent the spread of an abnormal electrical process over the cortex, epanutin actually reduces the size and intensity of the focal trigger mechanism. Now in the induction of convulsions by electricity the stimulus consists of a pulse or burst of alternating current. Variation of the duration of stimulus actually varies the number of waves or number of stimuli which the brain receives. Variation of voltage varies the area of cortex subjected to an effective stimulus. When a very low-voltage (say 60 volts) stimulus is used, lasting about 0·5 sec., the type of fit is not as stereotyped in character nor as constant in duration as when a larger briefer stimulus is given. Both stimuli may be above threshold, in that a convulsion follows, but the convulsive process is not identical in the two cases. When a weak, long stimulus is used the convulsion is often delayed in onset, focal in extent and may last much longer or shorter than the average. This is presumably because only a small area of cortex is stimulated effectively, so that the epileptic process does not develop simultaneously in all places, as it does when a strong stimulus is applied and the whole frontal cortex is thrown into synchronous maximal activity. The effect of epanutin in doses insufficient to prevent fits altogether is very similar to that of reduction of voltage—the convulsion is more ragged and localised and its length is more variable. As a working assumption epanutin may be considered as raising the electrical threshold of the cortical cells so that a stimulus of fixed strength will affect fewer cells. But that is not all; the duration of the stimulus must also be increased to compensate for the effect of the drug, which must therefore have some action on the cells which affects their tendency to repetitive discharge. In electro-physiological terms this may be attributed to a decrease in the time constant of accommodation of the excitable structure, and it is probably this action which is the more important in fit-control, rather than the simpler threshold raising effect. If this is so, it helps to account for the absence of a sedative or hypnotic action, since a moderate increase in accommodation would not necessarily impair the normal functioning of the excitable tissues, although it would decrease their liability to repetitive activity. This may be compared with the reverse effect of excitatory drugs, such as tetra-ethyl ammonium iodide (Cowan and Walter 1937). If epanutin increases the accommodation rate in normal brains there is no reason why it should not also have this effect in epileptic brains, and it may well be that the specific anticonvulsant action of the drug is due to this property. This theory is speculative, but it accounts for the facts discovered so far; it is hoped to test the hypothesis by prediction of results in a further series of observations.

* The "impedance angle" is an electrical measurement. It might be called an electro-histological test of thyroid activity. Introduced by Brazier in 1933, it has been adopted by centres in many countries as a substitute for or supplement to measurements of basal metabolic rate. The whole body of the patient is made an arm in a modified Wheatstone bridge and measurements are made with a very small alternating current at about 10,000 cycles per sec. At this frequency the body behaves not merely as a simple resistance but also as an electrical condenser. The impedance angle is a gauge of the magnitude of this condenser attribute. It is not a "skin effect" but is a characteristic of the body cells as a whole. It is not affected by exercise or drugs, except thyroid extract or thyroxin. It has been found a very trustworthy test of thyroid activity, being probably a measure of the average electrical thickness of the cell membranes. Brazier devised an arbitrary scale, corresponding with the clinical B.M.R. scale. A reading of plus 20 is therefore above the normal range for women.

SUMMARY

Epanutin in various doses has been administered to ten mental patients undergoing electrical convulsion therapy.

In all patients the electrical convulsion threshold was significantly raised. In the smaller patients the rise was so great that it became impossible to induce a convulsion at all.

The margin between maximum therapeutic and minimum toxic dose is small. Six capsules a day had little more effect on the convulsion threshold than three a day, but toxic signs were more prominent.

The full effect of the drug may not appear for up to 6 days after the first dose. After withdrawal the effect may persist for up to 14 days depending on the frequency of induced convulsions.

Even when the convulsions were not entirely inhibited by the drug they were made more variable and ragged, less typically epileptic. Partial seizures of the Jacksonian type were more common.

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Medical Societies

ROYAL SOCIETY OF MEDICINE

AT a meeting of the Section of Medicine on March 25, with Sir MAURICE CASSIDY, the president, in the chair, a discussion on

Dyspepsia in the Forces

was opened by Colonel H. LETHEBY TIDY. From the time of the first arrival of the British Expeditionary Force in France, he said, attention was focused on the amount of dyspepsia in the Army. Of all cases diagnosed on the nominal roll, 50% were said to have some type of dyspepsia. He expected to find in his investigations some form of neurosis, or a conventional diagnosis used for convenience in invaliding, but he was surprised to find that almost all the cases had peptic ulcers. This great prevalence of dyspepsia and peptic ulcer continued in the military hospitals. Nevertheless, gastric disease is not the largest cause of invalidism or of invaliding in the Army. The chief causes of dyspepsia are peptic ulcer, including duodenitis and duodenal spasm; a group generally called gastritis but also known as functional dyspepsia; and an important group of transient dyspepsias. Patients in the last group are not often seen in hospital, but it outnumbers by several times the other two groups together. The remaining cases are divided among reflex disorders, malingering (this is extremely rare), and patients who are primarily psychoneurotic. During last August the proportion of gastric cases in all military hospitals was 17·3%. In recent months the proportion has become lower, and it does not seem to be increasing now that older men are coming into the service. Of the organic cases, peptic ulcer accounts for 51·9%, gastritis for

35%, appendicitis for 2·3% and cholecystitis for 0·8%. The last two figures agree closely with those of the Mayo Clinic. According to C. E. Newman, 92% of Army dyspeptics had symptoms before joining, and a more recent examination of recruits by Colonel J. Gibson Graham indicated that 94% of patients with peptic ulcer previously had symptoms of an average duration of seven years; in the more shadowy group of gastritis 80% had a previous history averaging nine years. Little attention has been paid to the large increase in dyspepsia in the civilian population during the last twenty years. Army rations are undoubtedly heavier than those to which most recruits have been accustomed as civilians, but considering the small amount of organic disease that begins in the Army and the remarkable health of the men in the training centres, it can be said that the Army diet is entirely satisfactory for healthy men who have not previously suffered from dyspepsia. The cooking, though it left much to be desired in earlier days, has improved out of all knowledge. These men would have relapsed just as certainly, though possibly a little later, on the best diet and cooking. Army routine is not compatible with the maintenance of health in chronic dyspeptics. A busman can take many light meals throughout the day—practically a Sippy diet. But in the Army, even in peace-time, a man with a peptic ulcer cannot live the routine life, and a regulation has for many years been in force that men with organic lesions or peptic ulcers shall be invalided. Those who have recently advocated the invaliding of all peptic ulcer cases have forgotten that this is the ordinary practice.

Many men who report sick with dyspeptic symptoms are classed as psychoneurotic and sent to psychiatrists and psychiatric wards. These have not been included in the medical returns as dyspeptic. If psychological factors are not often found in the medical ward, the exclusion of these cases is the reason. Newman, and also Graham, concluded that there is very little psychological disturbance in peptic ulcer and similar conditions. Peptic ulcer cases in hospital lose their symptoms purely on rest and dietetic treatment; psychological disturbances—unless they were gross—do not delay recovery.

The findings in gastritis cases are negative on admission. They correspond largely to the cases seen in outpatient departments who are investigated fully without any cause being found and are then sent back to their doctor. In the Army such patients have to go into hospital. The gastroscope might advance knowledge of them, but the Army does not provide gastroscopes. These cases cannot be dealt with by short courses of treatment. They are far more resistant than peptic ulcer cases and have far more of a "psychological aura." They should be sent back to their units. In the earlier months it was the practice to mark them down to lower categories, but that course completely failed; they relapsed and their symptoms continued just as definitely. They are capable of carrying on in spite of their discomforts and of making useful and efficient soldiers. It is the duty of medical officers to keep them in their units as long as possible; but when they have been twice in hospital it is useless to start them on a shuttle-service, and they should be boarded out.

Transient dyspepsia is nearly always discussed in terms of cases in hospital. The cases which never get there are far more numerous. A healthy man may report sick with dyspepsia during the second fortnight in his training centre, and a wise medical officer will reassure him and give him a bottle of medicine to avert the stigma of malingering. The man may report sick twice more in the next fortnight, perhaps once in the next, and then he becomes acclimatised. A weak medical officer would send such a patient to see a physician in hospital or a medical specialist. A good specialist would send him back with a strong hint not to refer such cases; but if he has had too much experience of consulting practice he will admit the man to hospital, where he will be fully examined with negative results, rapidly lose his symptoms and be discharged "cured." If a man comes into hospital twice for the same complaint he is unlikely to develop into a useful soldier; he has been converted into a case of incurable gastritis. Special hospitals, though they may offer the advantage of research, are not to be recommended for gastric cases; the work in the smaller hospitals has reached a very high standard.

Dr. C. E. NEWMAN described the investigation he undertook with Mr. R. T. Payne early in the war. The Army then consisted largely of old reservists and was faced with the dietetic problems of an expeditionary force. Later investigations, however, showed that organic lesions bulked large. Another group consisted of men with "gastric stomach"—one which always went back on them in times of stress. A good many of these men owed their symptoms to psychological trouble; on investigation they turned out to be cases of gastritis of the real Alexis St. Martin type. In the radiogram they showed nothing but sometimes a layer of residual secretion lying above the contrast meal; the test-meal showed an excess of hydrochloric acid, a high rising acid curve and an associated excess of mucus. Dr. Newman wondered whether the clinical picture of a year ago was not utterly different from that seen now. A good deal depends on the diagnosis between duodenal ulcer and duodenitis. The physician should assess the clinical evidence before he considers the radiogram, and should make the diagnosis as a clinician and not as a machine. The majority of cases diagnosed as duodenitis would, if clinical factors were taken into consideration, be called an ulcer. He found no evidence that neurotic factors played an important part in the genesis and maintenance of the ulcers he saw a year ago. Psychological factors are admittedly important in the causation of gastric disorder, but hardly any such factors were operating last winter, and the patients were damaged by their Army diet long before psychological factors could come into play. The distinction between organic and neurotic dyspepsia cannot always be made; many organic cases are neurotic and the ordinary gastric-ulcer case shows a certain mental abnormality. If both factors are present, both should be treated. A certain number of gastric cases in the Army ought to be fully investigated. It is unwise to let difficult cases go in and out of hospital; they are only spreading gastric notions and being useless soldiers. Without proper investigation there is a risk that medical officers are not behaving as physicians at all. There is a tendency to treat a soldier as a peculiar sort of animal. Unless some mechanism for examination exists the gastric case will not always get a fair deal.

Major J. G. SCADDING communicated a paper which was read by Dr. J. L. LIVINGSTONE, the hon. secretary. Major Scadding had investigated cases of digestive disorders referred as outpatients by unit medical officers in the autumn of 1940. They contained a preponderance of recent recruits, and in the majority the symptoms had started in civil life. Of a large group with gastro-duodenal symptoms who were examined radiologically, nearly half proved to have peptic ulcers. Some of the patients with proved ulcers had been very young at the first onset of symptoms—the average age was 26. In general the clinical picture of the proved ulcer group corresponded to that usually attributed to peptic ulcer, but some of the histories were far from conforming to the accepted picture. The real difficulty arose in cases where the radiological evidence was equivocal. Temporary dyspepsia might account for a number of the cases not considered clinically to be organic. Many who showed a smooth gastric outline with a normal duodenal cap gave histories highly suggestive of peptic ulcer. The discrepancy between radiological data and conclusions on clinical grounds is one of the most difficult problems of the specialist. The diagnosis of gastritis can perhaps only be established by gastroscopy; the diagnosis of duodenitis seems even less capable of actual proof. The only justifiable diagnosis in these cases is the non-committal one of dyspepsia. Vomiting seems to bear little if any relation to the gastric condition and does not mark any special type of Army dyspepsia. In very few cases in this series were psychological factors regarded as the principal cause of the symptoms. The atmosphere of uncertainty which surrounds dyspeptic cases without radiological examination has a very unfavourable effect. A special unit should be established to deal with doubtful cases.

Sir ARTHUR HURST remarked that in civil outpatients gastric outnumber duodenal ulcers by four to one; in the Army the proportion is reversed, though he could not say why. More than half the gastric cases admitted to the Radcliffe Infirmary during the past year were referred

for hæmorrhage, but Colonel Tidy said that this and perforation were extremely rare in the Army. The radiologists may be misleading the profession to some extent, and the clinician believes too much in radiological reports. Many soldiers may be diagnosed on radiological grounds as duodenal ulcer because of a healed crater. He supposed that if a gastric patient is doing important work and the Army wishes to keep him, it will be considered worth while to give him strict treatment and to return him to duty subject to definite instructions for aftercare. He wished some arrangement could be made between Army and civilian hospitals for the continuation of treatment. All the men invalided for gastric trouble should return as soon as possible to civil employment; he hoped they were receiving strict treatment during the weeks before they were boarded.

Lieut.-Colonel S. J. HARTFALL said he was distressed to hear that the Army did not propose to provide specialists with gastroscopes. Gastritis can be diagnosed gastroscopically, and the instrument also enables a large proportion of definitely negative reports to be given. He could not understand how Newman and Payne found so few neurotics; the incidence of a neurotic basis among his dyspeptics was about 60%—patients who were entirely negative to gastroscopic examination and could be handed over to the psychiatrist. Some 20% had a superficial patchy gastritis which he treated by keeping them in bed for ten days to a fortnight and washing out the stomach every morning with hydrogen peroxide a drachm to a pint, followed by 2 drachms of one of the aluminium hydroxide preparations, and a teaspoonful of the same drug every four hours between meals, which should be light. Unsuspected chronic gastritis is not likely to be the explanation of many cases of dyspepsia which give negative findings on examination.

Mr. REGINALD PAYNE admitted that the picture of the dyspepsia which he and Newman saw was largely different from the present one. He found considerable dislike of gastro-duodenal patients and a tendency to regard them too easily as malingerers. He thought that this discussion had demonstrated the need for an absolutely accurate diagnosis whenever possible. An adequate history cannot be stated in two or three lines. It is important that one person should summarise all the evidence and that the diagnosis should not be left to the radiologist or to anyone who has not all the evidence before him. Very few of the cases he investigated with Newman should have been accepted for the Army.

Colonel E. B. MARSH said he was that rare person, a regular Army physician who had been practising medicine in the Army all over the world since the beginning of the last war. Only one question has to be answered in dealing with a dyspeptic soldier: is he fit to be a soldier, and if so, in what category? To lose sight of this aspect is to waste much time. The incidence of ulcer is greatest between 19 and 22 in the Army instead of between 30 and 35 in civil life, because cases are reported earlier. He and his regular colleagues do not use the term gastritis except as a precise description. He has been accustomed to divide these patients into bun-eaters and beer-drinkers. He does not recognise the term "soldier's stomach." The gastroscope cannot be obtained anywhere, and to try to produce it specially seems unnecessary. Clinical evidence should be sufficient to decide whether or not a man is fit for duty.

Reviews of Books

The Art of Surgery

A Textbook for Students and Practitioners. (4th ed.) By H. S. SOUTTAR, D.M., M.Ch. Oxfd, F.R.C.S. London: William Heinemann. Pp. 779. 2 vols. 25*s.*

Mr. Souttar explains that his object in changing the format of his textbook has been to encourage its use as a companion for the student, rather than as an unwieldy book of reference. This change is welcome, for the popularity of the work with students is due in the first place to the fresh and interesting way in which the various subjects are presented, carrying the attention on from paragraph to paragraph. The thumb-nail illustrations have increased in number since the last edition, and are an excellent method of focusing attention. The author has had in the forefront of his mind the importance of developing in students a sense of proportion; he avoids dwelling on the details of surgical operations and allows himself to linger longer where he is dealing with fundamental principles. The section on fractures is the weakest, containing passages that will confuse, and may even mislead, the student brought up in the modern regime of exact and prolonged control of fractures by splinting—for example, the recommendation that in treating fractures of the arm or below the knee the splints used should be in almost all cases removable, so that the limb can be daily exposed for inspection and massage. However, Mr. Souttar quotes the Winnett Orr method of closed plaster treatment of compound fractures, where the splint is certainly not removed daily. Fracture of the neck of the femur, on the other hand, is described without reference to any method by which union can be obtained—he mentions neither the Smith-Petersen pin nor the Whitman plaster. Other omissions are probably more deliberate, serving an educational purpose such as the lack of any reference to the delayed treatment of acute appendicitis. The clinical descriptions are a pleasure to read, and the classification and arrangement clear and explanatory.

Experimental Physiology

(2nd ed.) By GEORGE H. BELL, M.B. Glasg. Glasgow: John Smith and Son. Pp. 192. 6*s.*

THIS book has been enlarged and the arrangement altered to a systematic one in place of the programme based on the Glasgow courses of experiments. It is still scarcely comprehensive enough to constitute a standard practical textbook, and is likely to be more use to Glasgow students than to others, but the experiments have been carefully selected so as to be representative, and most of them are clearly explained. The book is certainly good value for the money.

Weight Reduction: Diet and Dishes

With tables and recipes suitable for diabetics. (2nd. ed.) By E. E. CLAXTON, M.B. Lond. London: William Heinemann. Pp. 201. 8*s.* 6*d.*

WAR conditions have altered our outlook on weight reduction—it may even be, as it was in the last war, that we shall undergo compulsory slimming, though we hope not. There certainly has been and will be a qualitative change in the nature of the foods we can obtain. This book will be of use to those who want a brief dogmatic statement of how to obtain the vitamins which changes in the foods available may remove from our diet though the Ministry of Food has already knocked one of the recommendations on the head. It is that one pint of milk, a liberal helping of green vegetables and an orange should be used to satisfy the daily requirements of vitamins and inorganic elements. Today watercress, mustard and cress, radishes, and raw cabbage or turnip salad must take the place of the orange. It is a pity that Miss Lucy Burdekin in her interesting recipes has included none for raw, vitamin-C-containing vegetable salads.

This book will find a new and useful place in supplying the ordinary housewife with recipes for dishes made with little fat and no sugar. She is naturally chary of replacing sugar with saccharin for she does not know the proportions. Here she will find recipes for such things as sugarless marmalade and sugarless jams, and throughout the recipes the quantities of saccharin and a butter substitute (Lister's Golden Spread) are given. Moreover there are recipes for pickles, chutneys and sauces with little or no calorie value which would be useful in "getting down" the diets to which we may have to accustom ourselves. This edition has not lost any of its original value to doctor and patient by becoming more useful to the ordinary housewife. Dr. Claxton is firm on the point that any weight reduction by whatever means should be done under the guidance of a doctor, and he does not advise people to think of reduction unless they are 15–20% above the average weight. Slimming for slimming's sake is a mistake, but if anyone for his health's sake has to slim this is the book to tell him how to do it.

THE LANCET

LONDON: SATURDAY, APRIL 5, 1941

GETTING A MOVE ON

IT was one of the lessons of the last war, confirmed in this, that the life of a seriously wounded man often depends on how soon he reaches the hands of the surgeon. Delay may mean that sepsis and more particularly gas gangrene gain a footing from which no subsequent treatment can dislodge them. In the case of air-raid casualties time may be lost at the incident, during the journey to hospital, and at the hospital itself, and the likelihood of delay is not reduced by the division of authority which still exists. The teams which gather the wounded from the street, care for them throughout their treatment and return them to their homes should be made up of colleagues owning but one master. Moreover, it was not at first realised that the successful treatment of casualties is the business of the whole of the A.R.P. services, and not least of the fire brigades, police and wardens. Nor was it appreciated that though an admirable system of central and sub-control posts and report centres had been designed and brought into being success would often be thwarted by failure of coördination at the site of a major incident. For reasons of finance some of the services were established without non-commissioned or commissioned officers, and without these, even after long and rigorous acquisition of discipline, troops may fail in a crisis. The "incident officer," when he exists and when he is of the right stuff, is invaluable: he quickly brings order from disorder; he directs priority of services; he parks his vehicles so that none embarrasses the action of another; he keeps his area free for manœuvre; he acts upon and implements the advice of his specialist officers—police, fire, engineer and medical. The "incident doctor," now recognised as an indispensable entity, can inspire the activities of his first-aid parties and ambulances, and of those members of rescue and other services who find themselves actually tending the wounded, but "command" must leave him an unimpeded field for his own work. His presence gives confidence; his experience is a stand-by, most appreciated by the most competent of his party leaders; his syringe is at hand where needed; he is there for appeal when the difficult case leaves first-aid men in doubt. He knows when a single case demands the immediate dispatch of an ambulance; he knows when a casualty can safely wait for the full complement of stretcher cases to fill the vehicle.

With the incident officer and the incident doctor functioning as they should, it is certain that a wounded man will start his journey to hospital at the earliest moment feasible. It will not be at the site of bombing that time will be lost, and the time saved must not be wasted in hospital. There is nothing to be gained by rushing at the operative task. None but minor injuries are ready for immediate operation, and even the more lightly wounded are often so begrimed that, apart from the need for warmth and rest, time must elapse before they are ready for the theatre. But delay at this stage should be intentional—when the patient is ready for the theatre the theatre should be ready for him. This means that no hospital should be sent, or should accept if sent, more patients than it can cope with efficiently within a given number of hours. Some 10–12 cases for each operating-theatre seems to be the limit. A sure means must be found for intimating to those who direct the ambulances that a given hospital has taken in as many casualties as it can deal with. As a peripatetic correspondent urges, hospitals must not let pride in their competence and willingness for a long spell of work affect their estimate of what each link in the chain of their organisation can stand. When the breaking point looks like being reached it should be the routine to notify the central control of A.R.P. services, so that other casualties are diverted to other and less busy hospitals, and there should be no false shame in calling for the help of visiting teams in good time so that when they come exhaustion will not cloud their welcome.

EPIDEMIOLOGY OF YELLOW FEVER

FOR three centuries at least yellow fever has periodically ravaged the larger seaboard towns and cities of West Africa and tropical and subtropical America. Whether the disease was originally one of West Africa, and was conveyed thence by ships to the West Indies and to South America, or whether it has flourished in South America from remote times, is doubtful. From the African and American endemic areas it is known to have been transferred to Mexico, the United States, the Canary Islands, Spain and Portugal, Italy, and the small islands of Ascension and St. Helena in the South Atlantic. In 1865 an outbreak even occurred in Swansea, but the disease, so far as is known, has never invaded Asia or Australasia, although it was feared that the opening of the Panama Canal might facilitate the invasion, and more recently the development of rapid air transport has occasioned alarm as a potential method of spread.

An American commission in Cuba at the beginning of the present century established that a mosquito, *Aedes ægypti* (*Stegomyia fasciata*), served as an intermediate host for yellow fever, and that this mosquito, feeding on a patient during the first three days of his illness, could, after a lapse of about twelve days, transfer the infection by its bite to non-immune people. *Aedes ægypti* is essentially a domestic, or house-haunting, species of mosquito and is of world-wide distribution. The commission demonstrated that mosquito transfer was the normal method by which the disease spread from one individual to another and showed that contact infection did not occur in nature. They therefore postulated that the disease could be effectually controlled by measures directed towards the destruction of mosquitoes and the protection of the sick against the bites of these insects. Two theories—that yellow fever was primarily a disease of the large maritime towns, and that it was in nature conveyed from man to man solely by *Aedes ægypti*—determined the policy of the Rockefeller Foundation in combating the disease in South America. A vast amount of labour and large sums of money were expended on destroying what were believed to be the "seed-beds of infection," in the belief that these seed-beds were few in number and that their sterilisation would result in the disappearance of the disease not from them alone but also from the tributary areas periodically reinfected from them. The improved sanitation of Panama and Havana

resulted in the disappearance of the disease from these two cities, and also from many other cities of the Gulf of Mexico and the Caribbean Sea; the clearing of Santos, Rio de Janeiro and Nichtheroy was followed by the apparent disappearance of yellow fever from the whole of South Brazil; while anti-mosquito campaigns in the principal ports of the Amazon Valley led to its elimination from this vast region. After a campaign in Guayaquil, and another in Northern Peru in 1920, no further cases were recorded on the Pacific coast of South America. Similar results were later obtained in Colombia, Mexico and Central America, and during 1925 only three cases were reported from all the Americas; the complete eradication of the disease from America appeared to be in sight. In 1926, however, the movement of non-immune troops through north-east Brazil was attended by the temporary reappearance of the disease in several states. In 1928, yellow fever again broke out in Pernambuco and Sergipe, and shortly afterwards it appeared, after a lapse of twenty years, in Rio de Janeiro. The fact that Rio was about a thousand miles from the nearest point known to be infected during the preceding year did not escape notice, and the origin of the outbreak was not determined. During the height of this latter outbreak cases were recognised, attributable to it, at various points over a 4000 mile stretch of coast, from Buenos Aires to Belém, at Pará and up the Amazon river. The theory that the destruction of the large seed-beds of infection alone would suffice to eliminate the disease had, therefore, to be abandoned, and steps were taken to include smaller towns and rural villages in the campaign. Thus "rural" yellow fever was recognised as a factor in epidemiology in addition to the "urban" type.

Within the next few years the introduction of two methods of diagnosis profoundly altered the previous conception of the epidemiology of yellow fever. These were viscerotomy and the mouse-protection test. The first depended on the fact that certain specific changes occur in the livers of people dying of yellow fever. An instrument, the viscerotome, was devised to obtain samples of liver from cadavers without the necessity of performing an autopsy. This instrument could be used by laymen, and its employment was insisted on in certain areas whenever a person died within 11 days of the onset of a febrile condition, whatever the clinical diagnosis. The viscerotomy services examined specimens from many thousand bodies over considerable areas of South America, and demonstrated that many people were dying of yellow fever in the absence of "visible" outbreaks of the disease. They also showed that the distribution of the disease in "silent" endemic areas was much more extensive than had been expected, and further that yellow fever caused a considerable mortality among children, thus dispelling the idea that the disease was a mild one when it attacked children in endemic areas. The mouse-protection test, devised about the same time as viscerotomy, depends on the fact that the serum of people who have recovered from yellow fever contains specific immune bodies. If such serum is injected into a mouse at or about the time that the mouse is infected intracerebrally with a neurotropic strain of yellow fever virus, normally lethal to it, the mouse is protected against the effects of the virus. The test, therefore, shows if an individual has previously had yellow fever (or has been artificially immunised against it). The application of the test in South America again demonstrated that the disease was far more widespread than had been thought, and that it was occurring in areas where it had not previously been clinically recognised. A further use of the mouse-protection test is in dating the time of the occurrence of the disease. For example, if no children under six years give positive tests it can be assumed that the disease has not been present in that district for the last six years. The test also established the fact that yellow fever was occurring in the complete absence of the accepted vector, *Aedes ægypti*. The aedes-free endemic areas were chiefly jungle districts, and the disease was found among workers in the forests; this was an entirely unsuspected aspect in the epidemiology of yellow fever. It has now been established that in South America today yellow fever is primarily a jungle infection of which *Aedes ægypti* is not the vector, and that man is not an important reservoir of the virus. What the most important reservoir is has not yet been finally established, but it has been observed that the American howler and other monkeys die in considerable numbers at times when human infections are occurring in the forests. Three species of American jungle mosquitoes, naturally infected with the virus, have been captured.

The present position in South America is that there are three types of yellow fever—the *ægypti*-transmitted urban and rural types, and the non-*ægypti*-transmitted jungle type. The first two are acquired indoors, are likely to involve non-immune people of all ages in the vicinity, and tend to spread along the routes of human travel. They are dependent for their maintenance on the close association of man and *Aedes ægypti*. The third, or jungle, type is only acquired by forest workers, does not spread to other members of the community in the absence of *Aedes ægypti*, and spreads through jungle irrespective of routes of human travel. The first two are relatively readily controlled by anti-*ægypti* measures, but the last, which now dominates the epidemiological picture in South America, can apparently only be brought under control by individual immunisation of the exposed members of the population. In the laboratory the jungle virus is readily transmissible by *Aedes ægypti*, and thus if this virus is introduced to an *ægypti* district it can give rise to the epidemic *ægypti*-borne form of the disease; conversely, the *ægypti*-borne virus can be conveyed by the appropriate forest mosquitoes. Clinically, pathologically and immunologically the various types of the disease are indistinguishable.

In Africa the position much resembled that in South America. Yellow fever ravaged the maritime cities of West Africa, and, in view of the American work, attempts were made to clear up those foci of infection where *Aedes ægypti* was present in large numbers. Freetown, Lagos, Port Harcourt, Calabar and other cities were efficiently sanitated, and the severe urban and rural epidemics of the disease were controlled; but the sanitary work done in these cities did not prevent outbreaks in Mamfe, Kano and other remote places. The mouse-protection test was employed extensively in Africa, with the result that immune people of all ages were found over a large area

extending from the West coast to the Anglo-Egyptian Sudan, Uganda and Abyssinia in the east, and from the Sahara in the north to Angola and the Belgian Congo in the south. Over large tracts of country in which positive mouse-protection tests were obtained no clinically recognised yellow fever had ever been recorded. Silent endemic areas were demonstrated in Africa just as in South America. The extension of the test to domestic animals (cattle, sheep, camels, horses and monkeys) has revealed that certain individuals possess immunity to the virus, though it is known that the African monkeys in the endemic areas do not show any clinical manifestations when artificially infected with it. A disturbing feature has been the rapid rise in the number of immune persons in certain districts. In a district of the southern Sudan the proportion of natives whose blood gave positive protection tests rose from 0 to 18% within four years, without any clinically recognised yellow fever. In this district *Aedes ægypti* is almost non-existent. It has not yet been established that jungle yellow fever exists in Africa, but these facts suggest that it does. The potential danger of the situation is obvious, and is illustrated by a serious epidemic in the Nuba Mountain district of Kordofan Province of the Anglo-Egyptian Sudan. This epidemic, the greatest so far recorded in any part of Africa, occurred in a district where up to October, 1940, no case of the disease had ever been recognised clinically, although a mouse-protection-test survey conducted there some years before had shown the presence of the infection. The outbreak involved an area of 6000 square miles, there were 1600 deaths among the 15,000 recognised cases, and it lasted a couple of months before being brought under control. In so far as risk to an immigrant European population is concerned, the solution is easy. The artificial production of immunity with attenuated strains of virus is both effective and simple; and the protection afforded is of considerable duration. To deal with the indigenous population is a very different matter, as it is obviously impracticable to immunise them all. The most that can be done is to deal with outbreaks as they arise and above all to forestall the advent of the disease in the towns, particularly those on the East coast of Africa, by efficient sanitation and mosquito control. This is already being seen to.

MILITARY STOMACH TROUBLE

THE main facts about dyspepsia in the Army are becoming clearer as the number of published reports increases. The problem presents itself very differently to the various types of medical officer in the Army, and each of these has his own difficulties. The variety of clinical approach was illustrated in the discussion at the Royal Society of Medicine reported on another page. The unselected cases come first to the regimental M.O.; he finds among the total sick a large number of dyspeptics, and he has to decide which cases to refer to the medical specialist, and which to treat himself in the unit. We badly need reports from representative regimental M.O.s on the material which they see; no single report would be final, because the nature of the M.O. determines, to some extent, the number and nature of the patients he sees. An overstrict M.O. will find that his patients tend to be few and seriously ill, a new M.O. will see a good many who are "trying it on," a slack or over-conscientious one will find himself flooded with trivial complaints. But in order to get a notion of what dyspepsia in the Army means it is essential to find out how it presents itself in the first instance. It would probably be difficult to compare these findings with what was ultimately discovered about the patients, unless the survey was completed by a medical specialist, who could complete the record with the subsequent hospital findings.

The problem as it appears to a medical specialist is again not the same as it appears in hospital; the type of case found in the wards depends on what he selects for admission. Moreover, he determines to some extent the nature of the material he sees. If he admits too many trivial cases the regimental M.O. feels justified in sending more of the same sort, and if he is known to be interested in some specialty cases of this type will tend to predominate. Most of the information available is derived, naturally, from hospital material, because cases there are most completely investigated and seem to be most worth publishing. There is an opportunity here for the medical specialist to arrange with regimental M.O.s to keep records and publish with him a combined survey giving a complete picture of the cases. This would reduce to their true proportions estimates of the incidence of the different types of dyspepsia with which the Army is troubled.

The doctor in charge of the patients in hospital is well advised to have his dyspeptic patients examined as thoroughly as possible; his difficulty is the balancing of all the information in the light of the case-history in order to arrive at a diagnosis. Once the diagnosis is settled, treatment and disposal are not so difficult, although they present their own special problems. The difficulty is to deal properly with an inadequately diagnosed case. In weighing up the evidence, it is important not to allow any one item more than its due importance; X rays present a special difficulty. If an ulcer crater is visible, is it an active ulcer or a scar? And still more, is a duodenal distortion an active ulcer or a scar? And if no crater is visible, but all the other evidence points to the diagnosis of ulceration, how is the medical board to be convinced, tending, as it so often does, to require ocular demonstration? There are, and it is right that there should be, differences between different radiologists in their attitudes towards the interpretation of results; the only uniformity to be desired is uniform accuracy. But a responsibility rests on the radiologist, because he, and he alone, has had the advantage of seeing the screening. He is the first to gibe at the clinician who insists on interpreting the radiograms for himself. The value of real coöperation between radiologists and clinicians is illustrated by SAFFLEY's[1] recent paper in which he compares the radiological with the clinical findings in over 300 dyspeptic soldiers. Ulcers were demonstrated radiologically in about 40%, which corresponds with the general run of figures since the heavily ulcerated population of reservists investigated by PAYNE and NEWMAN was discharged from the Army. Only 2·2% were diagnosed radiologically as "duodenitis." Half the patients examined showed no radiological abnormality, and although these include three "normal" gastro-enterostomies and a few other hardly normal appearances, the figure suggests that many unnecessary cases were being admitted for investigation.

1. Saffley, R. *Brit. J. Radiol.* 1941, **14**, 96.

Annotations

LEUCOPENIA

LEUCOPENIA was always a useful diagnostic pointer, but recent advances in chemotherapy have brought it into prominence as an indication that the dose of a sulphonamide is approaching the limits of safety. Lawrence[1] urges physicians to "put more thought to leucopenia" and points out five possible mechanisms for its production: diminished manufacture of cells, increased elimination, increased destruction, redistribution in the vascular channels, and redistribution in the body as a whole. When we speak of leucopenia we nearly always imply a lack of polymorphonuclear leucocytes (lymphopenia is only of importance in the control of radium treatment) and Lawrence deals mostly with granulopenia. Diminished manufacture of granulocytes has received most attention since examples of it are now well known; it occurs as part of a general disturbance of blood-forming tissue in classical aplastic anæmia and probably also in pernicious anæmia and splenic anæmia. Acute agranulocytosis, which is apparently a primary disease of the granulocyte-forming tissue, has been extensively studied and the disappearance of the granulocytes has been traced to failure of the myeloblasts (the stem cells) or the myelocytes (the intermediate stage) to mature into adult cells. The actual marrow picture varies according to the stage of the disease but at times myeloblasts may be the only representatives of the granulocyte series. The cause of this arrest of maturation is most often a drug to which the patient is unusually sensitive, amidopyrin and the sulphonamides being the chief offenders. Plum[2] was actually able to demonstrate in a patient the disappearance of myelocytes from the bone-marrow after a dose of amidopyrin. But this is not the whole story; in some cases, after prolonged administration of a drug, especially one of the sulphonamides, agranulocytosis appears fairly quickly. If myelocyte-formation ceases development of agranulocytosis must, of course, be rapid, since the life of the polymorphonuclear leucocyte is only about 2–4 days, and R. L. Haden has estimated that some 5–10 billion new cells are required every day. But Plum and others have shown that in some patients only a few minutes elapse between giving a small dose of amidopyrin and the disappearance of granulocytes from the blood, and Vejlens[3] found that certain hydrophile colloids like globulin, which produce a leucopenia when injected intravenously, do so by causing the white cells to take up a marginal position in the venules of internal organs such as the liver, spleen, and omentum; they cause a sort of "leucocytic shock," since such leucocytes are temporarily out of the circulation. This seems a possible explanation of the sudden disappearance of circulating granulocytes in sensitive patients, and fits in with Israëls and Wilkinson's[4] observations that after a single test-dose infection can call back some of the granulocytes into the blood and that the rate of recovery seems uninfluenced by pentnucleotide. Lawrence and his co-workers have found this mechanism at work in the omental vessels of cats which had been given the virus of an infectious agranulocytosis—a disease which also arrests maturation of the granulocytes in the bone-marrow. This combination closely resembles that found in human agranulocytosis, and the mechanisms may be the same. There is no evidence, however, that virus infection is responsible for even those few cases of the human disease not traceable to drugs. Another condition which probably falls in the "diminished manufacture" group is the chronic neutropenia of which Piney[5] has reminded us. As originally described it presented a distinctive clinical syndrome of apparently causeless fatigue and lassitude; the only pathological finding was a granulopenia of less than 200 cells per c.mm. The disease is rare, but all who have reported cases agree on the usual failure of treatment, including pentnucleotide, to influence the leucopenia; Piney's case recovered after receiving Hepatex-T, a fact for which he can offer no explanation. When referring to redistribution of granulocytes in the body Lawrence has in mind the paradox seen best in some cases of acute leukæmia, when the tissues are packed with leucocytes but the blood contains fewer than normal. Robertson and Yu[6] have suggested that redistribution in the internal organs is the cause of the leucopenia of typhoid fever, since they were able to produce this effect with toxic filtrates of *Bacterium typhosum*; the missing leucocytes were found in the vessels of the lungs, spleen, and other organs. Convincing clinical examples of increased destruction or increased elimination of leucocytes have yet to be produced; such events are not easy to demonstrate. The researches quoted warn us that toxic inhibition of leucocytes may be brought about in a variety of ways among which redistribution is important.

SMOKER'S DYSPEPSIA

THERE are still differences of opinion about how far smoking interferes with gastric digestion; your moderate smoker will maintain that his cigarette after meals helps by putting him in the right frame of mind for efficient digestion, but at the other extreme there is a lot of evidence that smoking raises gastric acidity and so both increases the chances of duodenal ulceration and delays the healing of established ulcers.[7] This is to some extent a war-time problem, for smoking becomes more popular under war conditions, especially among those who serve by standing and waiting, and Beattie[8] has lately gone so far as to suggest that the kind friend who sent a million cigarettes to the troops in France might have done their gastric mucosa more good by sending a million glucose sweets or malted milk tablets instead. Ehrenfeld and Sturtevant[9] have reviewed current opinions and carried out test-meals on 33 normal people and 23 patients with peptic ulceration; on the first day the subjects took their meals without smokes, and next day after two cigarettes. We are not told whether they were smokers or not, neither are we given any particulars about the type of ulceration in the ulcer group, and the smoking was always done before the meal. Moreover, for some reason the picture was complicated by giving each subject 200 c.cm. of 7% alcohol (the equivalent of a glass of old ale) as soon as the fasting juice had been removed. The results therefore compare the gastric acidity after an alcoholic drink with those after an alcoholic drink plus two cigarettes. It was found that in 25 of the 33 normal people (76%) and 20 of the 23 ulcer patients (87%) smoking raised the gastric acidity. In 10 subjects (presumably ulcer patients) analyses were done on three successive mornings—first without smoking, next after smoking two ordinary cigarettes, and last after smoking two partially denicotinised cigarettes. In 9 of these 10 there was a definite rise in acid values after ordinary cigarettes, whereas after the denicotinised ones 5 showed no change and 5 only a slight increase in acidity. This suggested, though by no means proved, that it was the nicotine rather than other substances in the tobacco which was responsible.

The incidence of dyspeptic symptoms directly due to smoking, as shown by their disappearance after complete

1. Lawrence, J. S. *J. Amer. med. Ass.* Feb. 8, 1941, p. 478.
2. Plum, P. Clinical and experimental investigations in agranulocytosis, London, 1937.
3. Vejlens, G. *Acta path. microbiol. scand.* 1938, suppl. 33, p. 1.
4. Israëls, M. C. G. and Wilkinson, J. F. *Quart. J. Med.* 1937, **6**, 35.
5. Piney, A. *Lancet*, March 15, 1941, p. 348.
6. Robertson, R. C. and Yu, P. H. *Caduceus*, 1940, **19**, 73.
7. See Ryle, J. A. Gastric Function in Health and Disease, London, 1926, p. 111; and Hurst, A. F. Medical Essays and Addresses, London, 1924, pp. 4 and 33.
8. Beattie, N. *Brit. med. J.* Feb. 15, 1941, p. 257.
9. Ehrenfeld, I. and Sturtevant, M. *Amer. J. med. Sci.* January, 1941, p. 81.

abstinence, is not high; Ryle, indeed, regards it as very low. Probably susceptibility to tobacco sufficient to produce dyspepsia in an otherwise normal stomach is exceptional, most people being immune, though tolerance may diminish with advancing years or after an illness. There is some reason to regard intolerance as limited to those with the ulcer diathesis, but this is a complex subject, and in spite of the amount of work done on it would still repay investigation. We do not yet know, for instance, whether the gastric symptoms produced by tobacco, which may closely simulate peptic ulceration, are primarily due to pyloric spasm, as might be supposed from the vigorous peristalsis and diarrhœa sometimes seen in young smokers, or to hyperchlorhydria which excites pyloric spasm. Nicotine acts on the synapses of both the sympathetic and the parasympathetic systems, first as an excitant and later as a depressant. The results of a dose will depend on the balance between sympathetic and parasympathetic effects. The parasympatheticotonic person, who normally has a free flow of gastric juice, an active gut and relaxed sphincters, will presumably begin by showing an increase in these characteristics, followed by spasm of the sphincters and inhibition of bowel movements; the reverse picture will be seen in the sympatheticotonic person. Irregular action between the two systems, however, might presumably produce any combination of symptoms, including the pyloric spasm, active gastric motility and hyperacidity of the dyspeptic. Various other poisonous constituents of tobacco have been blamed for its ill effects—carbon monoxide, pyridine, ammonia, collidine, pectin, and even prussic acid and arsenic—but it is hard to ignore an observation made some years ago by Henry Moll[10] of Leeds. He was giving gr. 1/10–1/5 of nicotine thrice daily hypodermically to cases of post-encephalitic parkinsonism in an attempt to reduce spasticity, and in 6 cases fractional test-meals were done before and after a 2–3 weeks' course of this treatment. Of these, 1 showed no change in gastric acidity, but in the other 5 there was a definite rise; in 1 patient, indeed, whose acidity had been normal before treatment, there was a gross hyperacidity after 10 days on nicotine gr. 1/5 three times a day. This fits in with the clinical experience that there is a wide variation in the response of the individual stomach to smoking.

HOURS OF WORK IN GERMANY

WHEN the National Socialist government came into power normal working hours in Germany were fixed at 8 in the day and 48 in the week and could be altered only by agreement between the employers' and workers' organisations. With the suppression of the latter the government became the sole authority, and, by means of the regulations it introduced, a 10-hour day gradually replaced the 8-hour. By 1936, according to Waelbroeck and Bessling,[11] the 10-hour day had become usual in the metal-working, building and similar industries, and the practice extended in turn to most of the industries working for rearmament. Similarly, early in 1939 the length of the shift for miners was extended by 45 minutes to 8¾ hours. With the outbreak of war all restrictions on normal hours of work for adult men were abolished, as were the increased rates of pay for overtime and night work and for work on Sundays and holidays. Holidays, in fact, whether paid or not, were to be done away with. How far the authorities made use of their wide powers is not known but it is significant that less than 3 months after the outbreak of war it was found necessary to restore the regulations at least partially. "He who wishes to work for the reconstruction of the Reich," Marshal Goering had said in 1938, "must not only work 8 hours a day but must work as he has never done before." But the disadvantages of excessive hours of work were pointed out as early as the beginning of 1939 and by the end of that year the government restored a limit to the working of overtime in excess of the normal 8-hour day (10 hours being the general rule) and reintroduced annual holidays. The reason given for the reversal is that the care of the worker's health must be a fundamental object of labour protection even in war-time, and that the relaxation of regulations was justified only in an initial period. It seems likely, Waelbroeck and Bessling conclude, that the use made of the facilities for extending hours of work was excessive. Germany too has probably re-learnt the lessons of the last war only by practical experience.

10. Moll, H. and Flint, E. R. *Brit. J. Surg.* 1928, **16**, 283.
11. *Internat. Lab. Rev.* February 1941, p. 127.

INDUCTION OF LABOUR WITH UROSELECTAN B

WHEN amniography was first employed to obtain a radiogram of the placental situation in suspected cases of placenta prævia, various substances were used to render the amniotic fluid radiopaque. Among these was Uroselectan B and the operators who employed it were quick to notice that a high proportion of their cases went into labour soon after its intra-uterine injection. Playfair[1] has now used the drug as a deliberate method of inducing labour.

Uroselectan B is an iodine compound of complex nature combined with an organic base, so that in theory the iodine is not free to exert toxic effects on the body tissues, and this contention appears to hold good so far as intra-uterine introduction is concerned since it has been used for many years in cases of suspected placenta prævia without any harm to the mothers having been reported. Serial radiograms of the uterus after the introduction of uroselectan demonstrate that its maximum concentration lasts about half an hour, and no shadow of the amniotic cavity is to be seen after thirty-six hours; Burke[2] has been able to show that half of the drug is recoverable from the maternal urine at the end of this time. The fœtus in many cases shows a well-defined shadow of the stomach and colon, proving that it drinks its own amniotic fluid in sufficient quantities to render its alimentary tract radiopaque. The exact method of action of uroselectan remains obscure; it is more likely to be a local than a general one, since labour has not been observed to be prematurely induced by this drug in cases in which it was used for intravenous pyelography. Another reason for supposing the action to be local is that hypertonic saline and hypertonic glucose solutions when injected into the amniotic cavity will induce labour with a fair degree of certainty, the solutions employed being 10 c.cm. of 30% saline or 50% glucose.

Playfair found the optimum dose of uroselectan to be 10 c.cm. (half the one recommended for amniography), though he originally employed double this dose. After emptying the bladder, if necessary by a catheter, a point is chosen midway between the symphysis and the umbilicus; this point must be carefully palpated to exclude the interposition of maternal gut between the abdominal parietes and the uterus, and the exact fœtal position should be defined. Any operation scar in this region is a contra-indication to the use of uroselectan, for it increases the likelihood of maternal gut having become adherent, and though the risk of puncturing the intestine is probably exaggerated it is not one to be needlessly invited. Local anæsthesia and a fine lumbar-puncture needle are used. No uroselectan must be injected unless liquor amnii dribbles readily from the needle after removal of the stilette. Before and immediately after the injection it is important to count the fœtal heart-rate. If the placenta is inadvertently encountered it has been found to be safe to traverse this with the needle. Playfair advises that the best and quickest results are to be expected if the patient is kept up and about.

1. Playfair, P. L. *J. Obstet. Gynæc.* February, 1941, p. 41.
2. Burke, F. J. *Ibid*, 1935, **43**, 1096.

Any method of inducing labour must be assessed by its comparative speed, certainty and morbidity-rate for both mother and child. Out of his 115 cases, Playfair reports 4 failures, and the average time between injection and the onset of labour was roughly 29 hours—slightly longer than after artificial rupture of the membranes. His corrected fœtal mortality for uroselectan induction was 3·6%, while a similar series of controls, in which artificial rupture of the membranes was performed, had a fœtal mortality of 4%. His incidence of puerperal pyrexia was 5 out of 115—1 due to tonsillitis, 2 to urinary infection, 1 to red degeneration of a myoma and 1 to a local infection of an episiotomy. When it is considered that none of these was a true case of uterine infection this method compares favourably with other surgical methods, where an average infection rate of 10–15% is to be expected. One point strongly in favour of uroselectan is that it is no contra-indication to a subsequent cæsarean section, which was successfully performed in 2 of Playfair's cases; whereas it is a bold obstetrician who would consider section after surgical induction. The length of the various stages of labour was not appreciably different when uroselectan was compared with the other methods of induction.

THE BRAIN-STEM IN CONCUSSION

Denny-Brown [1] lately called attention to the cases of head injury which, after a latent period, develop collapse associated with bradycardia, headache and a variable degree of neck rigidity. The blood-pressure remains normal and the clinical developments do not seem to be directly related to raised intracranial pressure or to subarachnoid hæmorrhage, though the latter was present in some cases. The eventual recovery of Denny-Brown's patients made it impossible to study the underlying pathology, but, mainly on account of the prominence of bradycardia, he tentatively ascribes the condition to contusion of the medulla oblongata. Slowing of the pulse was associated with other evidences of vasomotor instability and was observed only with the patient absolutely at rest; any activity was always followed by acceleration of the pulse, which was maintained for 2–3 hours after return to bed. Denny-Brown's experience of gunshot wounds of the head in the present war, taken in conjunction with records of similar cases in the war of 1914–18, leads him to postulate that the entry into the skull of small fragments of metal communicates little momentum to the brain as a whole; but the high velocity of such fragments transmits pressure to the foramen magnum and leads to concussion or contusion of the medulla oblongata. This suggestion may turn out to be fundamentally important in the pathology of concussion in general, and may explain why so many victims of head injury die within the first 24 hours. The brain in these subjects often shows an amount of trauma which seems insufficient to have caused death. In this connexion Denny-Brown and W. R. Russell [2] have found, by experiments on cats under Nembutal anæsthesia, that concussion, even resulting in death, associated with cessation of respiration and rise of blood-pressure without macroscopic lesions in the brain-stem, may be produced by a blow when the head is free to move and yet will not be produced by the same blow when the head is firmly fixed; they justly argue that the concussion must therefore have been due to the acceleration imparted to the nervous tissues. Possibly microscopic examination would have supplied further information.

Schaller, Tamaki and Newman [3] have studied the distribution of petechial hæmorrhages by serial sections in a number of rats which were severely but not fatally concussed. The petechiæ were widely distributed throughout the brain but were noted particularly in the deeper tissues, including the basal ganglia and the brain-stem. There were no large hæmorrhages or softenings. In animals surviving for long periods such foci showed evidence of repair. These workers stress the vascular basis of concussion and trace the production of petechiæ from vasodilatation leading to stasis, anoxæmia and permeability of the vessel wall. They found no evidence of damage to the myelin sheaths, no gliosis remote from the vessels, and no progressive pathological involvement of the vascular system. Although they did not lay any special emphasis on damage to the brain-stem their finding of petechiæ in this situation in so many examples fits in with Denny-Brown's conception. Possibly the control of consciousness may turn out to be situated in this part of the brain. Thus Cairns,[4] in his account of gunshot wounds of the head in 1940, says "it is remarkable that cases of foreign body penetrating the frontal and parietal lobes showed no loss of consciousness, whereas a foreign body passing through the petrous bone into the cerebellum produced unconsciousness which lasted several days. Is the unconsciousness (concussion) of closed head injuries of civil life due," he asks, "to commotion of the whole brain, or to damage to some part of it, such as the brain-stem?"

1. Denny-Brown, D. E. *Lancet*, March 22, 1941, p. 371.
2. *J. Physiol.* 1940, **99**, 153.
3. Schaller, W. F., Tamaki, K. and Newman, H. W. *Arch. Neurol. Psychiat.* January, 1941, p. 1.

SOCIAL HYGIENIST WANTED

Sir Drummond Shiels, who has been medical secretary of the British Social Hygiene Council for some years, is retiring from this post, though he will still act as medical adviser. As announced in our advertisement columns, the council are in need of a successor, who must be a doctor familiar with the problems of sex education and of venereal disease. Much of the council's work is now concentrated on teaching young people between 16 and 25 the elements of sex knowledge and guiding them on sex behaviour. The medical secretary's duties, which are part-time, are to travel on the council's behalf in the provinces, discussing their difficulties with medical officers of health and V.D. officers, giving lectures, and keeping a professional eye on the council's courses of instruction.

Dr. J. E. A. UNDERWOOD has been appointed senior medical officer to the Board of Education in succession to Dr. J. Alison Glover, who reaches the age of retirement on April 10. Dr. Underwood had served for four years in the R.A.M.C. and was an experienced school medical officer before joining the board's staff in 1925. In that year he was secretary to the Departmental Committee on defective vision in children and since 1928 he has been chiefly responsible for advising the board on schools for blind and deaf children. The 1931 report on partially sighted children was largely his work and he represented the board at the world conference in New York on the welfare of the blind. He takes up his new responsibility with a wide knowledge of the school medical service generally and of the work of special schools.

Dr. JOHN SMYTH MACDONALD, F.R.S., who died on Saturday last at Bridge-of-Allan, held the Holt professorship of physiology at Liverpool University from 1914 to 1932 after having occupied the similar chair at Sheffield for 12 years. His work on the function of muscle and nerve was widely known. He was in his 74th year.

THE following have been appointed honorary physicians to the King for three years: Sir HENRY BASHFORD, chief medical officer at the Post Office; Sir WELDON DALRYMPLE-CHAMPNEYS, deputy chief medical officer at the Ministry of Health; Dr. J. M. MCCLOY, chief medical officer at the ministry of home affairs for Northern Ireland; Prof. W. W. C. TOPLEY, F.R.S., head of the emergency public-health laboratory service; Dr. R. VEITCH CLARKE, medical officer of health for Manchester; Dr. W. G. CLARK, medical officer of health for Edinburgh; Dr. JAMES FERGUSON, medical officer of health for Surrey.

4. Cairns, H. *J. R. Army med. Cps*, January, 1941, p. 14.

Special Articles

U.S.A. *VERSUS* A.M.A.

THE great trial in which the American Medical Association has to defend its attitude towards certain methods of "group medical practice" is shown to be well under way by an instalment (just received) of the verbatim report which the association is publishing in its journal.[1] Two counsel have made opening statements for the prosecution. The first has explained how the Home Owners Loan Corporation initiated the project of Group Health Association, Inc., because H.O.L.C. (if we may adopt the convenient use of initials so well developed in America) found that its borrowers needed so many loans to meet doctors' bills, and thought that an ampler and better medical service, preventive as well as curative, could be furnished coöperatively through G.H.A. The defendants include not only the A.M.A. but also the Medical Society of the District of Columbia, the Harris County Medical Society, the Washington Academy of Surgeons and 21 named individuals. Counsel alleged a conspiracy to prevent the 800 or more doctors of the Medical Society of the District of Columbia from accepting employment with G.H.A., to obstruct G.H.A. in its efforts to obtain doctors from practitioners who were not members of the society, to attack doctors who joined G.H.A. and to persuade them to abandon the connexion under threat of professional discredit in their practices and in their hospital work, and lastly to induce all local private hospitals to join in the boycott of G.H.A. by refusing to admit Group Health doctors to hospital privileges. A subcommittee of the A.M.A., it was said, had reported that G.H.A. was unethical and that participation in it by any member of the District of Columbia Medical Society would make him liable to disciplinary action as well as deprive him of courtesy facilities at various hospitals which the A.M.A. had coerced into the boycott.

The additional opening statement by a second counsel for the prosecution was mainly concerned with what, without any intended disrespect, might be called blue-book material. He outlined the general developments of preventive medicine, bacteriology, radium, cardiography and X-ray examination and dealt with the report of the American expert Committee on the Cost of Medical Care. His object was to show that families in the lower income-groups receive too little medical service and find the cost of illness disastrous. This information was material to indicate that Group Health Association and similar organisations improved the distribution of medical care and spread the cost by a system of periodical payments. The American College of Surgeons, said counsel, had recommended in 1934 the continuance of experiments with periodic prepayment plans because they gave hope of more adequate medical care for the low-income groups. A week later the A.M.A. had passed a resolution condemning the college for its recommendations. The A.M.A. insisted that any such plan should comply with its own general principles. One of these was that the plan should embrace all the qualified physicians within the locality; another required the cost of medical service in any plan to be borne by the patient who could afford to pay at the time when it was rendered. The A.M.A., alleged counsel, was hostile to group practice on the prepayment basis and had gone beyond peaceful persuasion in its methods.

It may be convenient at this point to note that these proceedings are criminal, not civil. There is an indictment, running into 30 pages, alleging conspiracy and violation of the so-called Sherman Anti-Trust Law. This statute, named after its sponsor John Sherman (the younger brother of the famous general of the Civil War), was passed in 1890 and has since been modified. Not content to rely on the common-law doctrine which makes agreements "in restraint of trade" unenforceable, it prohibits under heavy penalties any contract, combination or conspiracy which restrains trade or attempts to establish monopoly. In England we should expect a case of this nature to be dealt with not by a criminal prosecution but by an application to a Chancery judge for an injunction and a declaration of the rights of the parties. Our classic authorities on the law of restraint of trade are mostly decisions in civil proceedings—the Mogul Steamship case in 1892, the Maxim-Nordenfeldt case in 1893, and the pronouncement by Mr. Justice Astbury in the Firemen's Union case in 1926 which exercised no small influence upon the general strike. It is perhaps unnecessary to explain that the District of Columbia is (like Canberra in Australia) a federal area lying outside the jurisdiction of the separate states. It was carved out of Maryland on the north and Virginia on the south, and it accommodates the federal government of the whole country. There are in America many towns called Washington; this one is distinguished as "Washington, D.C."—Washington in the District of Columbia. Its great and growing population is largely official. The American law-courts are of two kinds—those belonging to the several states and those of the federal government. In the latter class is the famous Supreme Court of the United States at Washington which says the last word upon all constitutional disputes and upon the validity of all legislation (whether state or federal). The trial of the A.M.A. is proceeding at Washington in one of the district courts of the federal system. American forensic procedure often strikes English observers as old-fashioned; but the deliberate efforts to secure a jury which will eschew all bias are doubtless necessary in this case where so many Washingtonians may be members of G.H.A. or patients or friends of the defendant doctors. The court has patiently examined all the prospective jurors to find out whether they are subject to any such influence and even whether they (or members of their families) are officials of the United States, the prosecutor. Jurors have been asked by the court if they or any members of their families have ever been sued by a physician, or if they have ever "had any occurrence which has aroused any antagonistic feelings towards a doctor, a physician, or any group of doctors or physicians"; had they formed any opinion about the right of hospitals to select doctors for their staff, or about the right of doctors to organise themselves in associations with rules and regulations governing professional practice? And so on.

To return to the trial, the two opening addresses for the prosecution were followed by a spirited opening address by counsel for the defendants. He explained the constitution and standards of the A.M.A.; its formulated ethics were derived, he said, from an Englishman named Thomas Percival who in 1803 framed them for the College of Surgeons in the City of Manchester in England. The code, based on the oath of Hippocrates, had been proved to be the only safe standard for distributing medical care to the public and the patient. The great developments in medicine, outlined by the prosecution, had been due to the efforts of the A.M.A. to prevent the destruction of progress by quacks and charlatans who advertised their wares in such language as the G.H.A. was using—"You can't sell medical service as you sell baked beans."

1. *J. Amer. med. Ass.* 1941, **116**, 601-630.

PLAN TO CHECK RHEUMATISM

RHEUMATIC disease, though widespread, painful, disabling and responsible for great economic loss, has never roused public sympathy or conscience as keenly as tuberculosis, cancer or venereal disease. For one thing it presents no clear-cut picture; how can it, when the word has been used to cover at least two, and probably more, distinct disease entities? The acute and subacute rheumatism of childhood, manifesting itself as rheumatic fever, tonsillitis, chorea and growing pains and bringing in its train heart damage, invalidity and often death, has probably nothing in common with the disabling muscular rheumatism, fibrositis or osteo-arthritis of later life; and these again may prove to be distinct from rheumatoid arthritis, and even from each other. To devise a plan which will ensure the diagnosis, treatment and aftercare of all these is not simple, but Lord Horder, in collaboration with the Empire Rheumatism Council, has some practical suggestions to make.[1] Their plan was almost ready in 1939 but it seemed

1. Rheumatism: A Plan for National Action. London: H. K. Lewis. 2*s*.

doubtful whether the time was then opportune to publish it; now Lord Horder feels that "considerations of humanity, of national safety and true economy plead for some immediate effort to check rheumatic disease." What he has to say is addressed to all who are interested in public health, and he writes without using unnecessary scientific terms.

THE PUZZLE

In stating the extent of the problem he notes that adults with rheumatism in England and Wales can be conservatively estimated at over a million, and the economic loss among insured workers at £17,000,000 a year. Cases of juvenile rheumatic disease, calculated on the basis of the statistics of the L.C.C. medical service, he puts at 200,000 in Great Britain.

Our knowledge of the ætiology of rheumatic disorders is still vague. Discussing possible factors in its causation, Lord Horder shows how far our questions were ahead of our knowledge, and pleads on almost every page for more research. In juvenile rheumatism we can say that infection, bad housing and perhaps heredity, defective diet and scanty clothing play a part. In adult rheumatic disorders occupations figure largely, especially those which invite small injuries, bruising, repetitive movements and cramped attitudes. Climate, of course, does its share: "the old man carries the almanack in his bones." Other factors suspected of contributing are focal sepsis, glandular dystrophy, some inherited or acquired biochemical flaw, diet, heredity, mental or emotional disturbance, housing, injury and geological conditions. Against most of these can be set a question mark; we do not know how much or how little they act as rheumatic provocants. Uniform record-keeping and a thorough study of cases should settle some of these questions; others require intensive work in the laboratory.

WHAT CAN BE DONE

Little as we know about the cause of diseases grouped under the heading of rheumatism we can—contrary to common belief—do a good deal for them. Juvenile rheumatism presents a problem of its own, calling for early diagnosis, determined treatment and steady aftercare. For the chronic rheumatic diseases of adults much can be done by physical treatment in its several forms, massage, pyrotherapy and shock therapy, physical exercises, drug therapy, orthopædic measures, colonic lavage and vaccines. Lord Horder assesses the relative value of the various remedies cautiously but is able to quote figures from many treatment centres showing the excellent results obtained by a judicious and persistent attack on the symptoms; no claim is made that any treatment now in use strikes at the unknown cause.

At the Devonshire Royal Hospital 3062 patients were admitted in 1937–38, of whom 2617 were discharged cured or much improved. At the Royal Mineral Water Hospital at Bath 62% of patients were cured or relieved in the eighteenth century, 88% in the nineteenth, and 95% (so far) in the twentieth. The British Red Cross Clinic, treating out-patients only, claims that 60·3% of patients are freed from objective symptoms and 29% improved, leaving a balance of 11%. An American treatment centre reports that 75% of cases are cured or improved, 20% are refractory and 5% hopeless.

This is an encouraging picture, suggesting that if we can place appropriate treatment within reach of all who need it the practical problem is largely solved.

THE PLAN

Lord Horder suggests that this could be done by setting up, on a regional basis, specialised treatment centres each of which would supervise a number of local centres in its own area. The special centres would diagnose and treat both inpatients and outpatients referred by local treatment centres, hospitals or private doctors. Each special centre would be under the charge of a whole-time permanent medical officer with special experience of rheumatic disease, and would be staffed by qualified assistants, paid or voluntary, including workers in every branch of physical therapy, radiology, hydrology and chiropody. The centre would also have access to a full consultant staff of physicians and surgeons, including an orthopædic and manipulative surgeon, a dental surgeon, a gynæcologist, a rhino-laryngologist, a pathologist and a radiologist. Ten to fifteen such centres, it is estimated, would be sufficient for Great Britain.

Local treatment centres should of course be much more numerous, and would treat outpatients only, each centre being equipped to deal with anything from 50 to 250 patients a day, depending on local needs. The local centres would provide massage, remedial exercises and the simpler heat and electrical treatments. The staff would be trained in massage, one of them having in addition a qualification in hydrology, and one a full nursing qualification. Patients would be received on the recommendation of their own doctor, remaining under his treatment for everything except their rheumatic symptoms. Is it, perhaps, questionable policy to divide the patient up according to his diseases in this way? In theory it seems unsound and though in practice it might work out fairly well, it deserves careful preliminary consideration. The medical officer in charge of a local treatment centre would not necessarily be on whole-time service but might have charge of two or three centres; he should have special experience in the diagnosis and treatment of rheumatic disease. Through close liaison with the special treatment centres, consultants would visit the local centres when their advice is needed.

One aim of the plan is to educate the patient in the understanding and care of his own disease, and this will be achieved at the special treatment centres, by lectures, and films, which will instruct him in the importance of such things as diet, rest, clothing and exercises. It will even be possible for some patients to carry on a simple course of treatment at home, thus avoiding frequent visits to the local centres; in this they will naturally need the supervision of skilled social workers. This system has worked well as organised by the Mayo Clinic arthritis department.

Another aim of the plan is to train sufficient medical personnel in the diagnosis and care of rheumatism by arranging special postgraduate courses and lectures, not only for those who are staffing the clinics but for school medical officers and any other doctors who are interested. Some of the special centres, it is hoped, will be attached to university medical schools; and the medical staffs of all of them should be equal to the teaching task required of them.

The plan will divide patients into three sections: a large group who after a short period of institutional treatment and an educational course would be able to carry on home treatment with periodic visits to a local centre; another large group who could attend regularly at a treatment centre; and a small group who would need inpatient care or treatment which could only be given at a special centre.

The cost of the scheme would not be as great as appears at first sight. The special centres would be accommodated in existing hospitals, clinics and spas which could provide the necessary equipment; the local centres could be housed in hospitals, pit-head baths, public baths, welfare premises of factories or if necessary in huts put up for the purpose.

The cost of treatment could be met in full by those who could afford it, at a concession rate (for example, through the Hospital Saving Association) by those with less means, and by an extension of the National Health Insurance system for insured workers. At present there are very few rheumatism treatment centres at which approved societies can arrange treatment for their members, and it is scarcely just that a man in London or Sheffield should have opportunities for treatment which are denied to his fellow in some other part of the country. All contributors, as Lord Horder points out, should be on an equal footing. He sees no need for elaborate centres or equipment, believing that research will shortly give us fuller knowledge and thus more control of the diseases treated, and that early diagnosis and treatment will reduce the morbidity from rheumatism.

RHEUMATIC DISEASE IN CHILDHOOD

The problem presented by juvenile rheumatism is of course entirely different. Here Lord Horder believes the best hope lies in a national plan on the lines of the L.C.C. rheumatism scheme, which has helped to reduce the incidence of recorded heart disease in the L.C.C.

school medical service from 2% in 1926 to 0·77% in 1926. This scheme provides supervisory centres to which children suspected of rheumatic diseases are referred. Children who are fit for ordinary education return to school but are kept under supervision; those who need treatment are referred to rheumatism units outside London, and those cardiac cripples who can benefit by appropriate education (about 16%) are sent to special schools. In a standard year there are usually about 2000 children attending such schools.

A similar scheme in its full range could be applied by local authorities to all state schools, and impoverished areas should receive grants from national funds for the purpose.

RESEARCH

There remains research: the most urgent need of all. For this the Empire Rheumatism Council is willing to assume responsibility, with what help can come from the Medical Research Council, the various medical research foundations and the medical schools. In addition, the treatment centres, once in action, would become a source of statistics capable of answering many of the questions still left teasingly open.

MEDICINE AND THE LAW

Aortic Disease an Accident

In the case of Tyler *v.* New Hucknall Colliery, mentioned lately in this column, the Mansfield county-court judge held that the perforation of a duodenal ulcer was not an accident within the Workmen's Compensation Act. More recently, in Tennant *v.* Coppice Colliery Co., the Walsall county-court judge decided in the workman's favour where a blow, received in the course of his work, was said to have accelerated the disease of the aorta. The man worked for two days afterwards, stayed away on the third day, gave up work after a brief attempt on the fourth day and went to hospital where he was X rayed. He died suddenly about a fortnight later. The pathologist who made a post-mortem examination for the purpose of the inquest gave evidence before the county-court judge which was consistent with the death being in no way due to the blow. There was, said two medical witnesses, a failure of the blood-supply in consequence of the blocking of the arteries. The calcification of the aorta was exceptional; the calcareous matter had been accumulating over a long period and the accident had no effect upon it. The judge, however, pointed out that the employers had been unable to explain why the workman, having had nothing wrong with him before the blow, had suffered pain after it. Drawing the inference that the accident had markedly accelerated the development of the condition of the aorta, he awarded £600 compensation.

Inadmissibility of Coroner's Verdict

In Tennant's case, mentioned above, the coroner's verdict had attributed death to the occlusion of the right coronary artery. The verdict of an inquest is, of course, of no value in other courts. This was clearly illustrated in the tragic case of Pollock *v.* Pollock this year. Last June a devoted husband, worried and oppressed by the war news, shot his wife and then shot himself. His wife had left her estate to him, but the law does not allow a murderer (or anyone who claims through him) to profit by his crime. The husband had killed his wife. If he was insane at the time, it was not a murder; but the burden of proving insanity lay upon the husband's representatives and, the husband being dead, they were not likely to be able to discharge it. The wife's executors applied to a Chancery judge for advice. They were told that they should act on the assumption that the husband had murdered his wife, and they should not hand the wife's estate over to the husband's representatives. A coroner's verdict had recorded that the husband killed his wife while his mind was unhinged; but Mr. Justice Farwell was unfortunately prevented by law from taking note of the facts determined by the inquest.

Workman's Denial of Disease

A workman, on entering a mining company's employment, untruthfully made a written statement that he had never suffered from nystagmus. The disease appeared and he qualified for compensation on the certificate of the examining surgeon who fixed the date of the disability. The company exercised its right to have the workman examined by a surgeon to whom the patient admitted that he had previously suffered from nystagmus. This surgeon reported the disability to be a severe case and recorded the patient's admission. The Workmen's Compensation Act purports to disqualify a claimant who has made a false denial on entering employment. The company nevertheless paid the man compensation at the full rate until, many months later, payment was discontinued on the ground of the false representation. What the Act says (in paragraph (*b*) of section 43 (1)) is that "if it is proved that the workman has, at the time of entering the employment, wilfully and falsely represented himself in writing as not having previously suffered from the disease, compensation shall not be payable." The county-court judge held that there was false and wilful misrepresentation, but he also held that the paying and receiving of compensation formed a binding and concluded agreement between the parties and that all questions of liability were thereby settled. The Court of Appeal has upheld the county court. Section 43 (1) (*b*) is not an absolute prohibition. Those initial words "if it is proved" create an issue of fact for an arbitrator to try. This issue can be the subject of an agreement between the parties. If the employers chose to pay compensation without availing themselves of such precautionary safeguards as the lawyerlike words "without prejudice," and if they offered no explanation, their generosity was fatal.

SCOTLAND

POLISH MEDICAL FACULTY IN EDINBURGH

The discussions which have been in progress between the British and Polish governments and the university and municipality of Edinburgh regarding the institution of a Polish medical faculty in Edinburgh achieved their end in the McEwan Hall of the University on March 22. Monsieur Wladyslaw Raczkiewicz, president of the Polish Republic, formally constituted the faculty and named its members. Sir Thomas Holland, vice-chancellor of the university, said that though wars had occurred in every century, countries had been invaded, and local institutions had been brought under the control of conquerors, never before, since their rise in the fourteenth century, had universities in any country been ruthlessly destroyed. For precedent it was necessary to go back another eight centuries to the time when the schools of the Roman Empire were swept away by other Teutonic savages, who by that means inaugurated the Dark Ages. Among the first of the universities founded with the revival of learning was the Jagiellonic University of Cracow which maintained its reputation as a great home of liberal education for just 540 years until, along with its sister universities, it was lately destroyed. The Polish universities had produced poets and historians of great distinction, of whom, because of our linguistic limitations, we knew too little. But of those Poles who had published their works in the universal language of music, everyone knew of Chopin and Paderewski. The scientific and a wider world, too, revered the names of two famous Cracow graduates, Nicolaus Copernicus, who in a double sense revolutionised astronomy in the sixteenth century, and Marie Sklodowska, known to fame as Madame Curie. Round a nucleus of a dozen professors and about fifty students he said, would grow a school of medicine so vigorous that its Edinburgh cradle would barely be large enough to hold it until it was free to return again to its native land, there to inaugurate a new era as the foundation faculty of the rejuvenated Universities of Poland. Sir John Anderson conveyed to the new faculty the best wishes of the British Government; in reply Professor Kot, the Polish minister of the interior, traced many academic associations between Poland and Scotland in the past. Prof. Sydney Smith, dean of the faculty of medicine, also welcomed the newcomers. Professor Jurasz, the newly appointed dean of the Polish faculty, looked forward to a time when they would all meet as free men, in free

countries, in a free Europe. The honorary degree of LL.D. was conferred on President Raczkiewicz.

It was subsequently announced that the public-health committee of Edinburgh town council had approved a proposal that, in connexion with the Polish medical school, Polish patients should be treated at the Western General Hospital. The Department of Health for Scotland was prepared to allocate up to 150 beds under the Emergency Hospitals Scheme for the purpose. The beds set aside for Polish patients would be staffed by Polish doctors and tended by Polish and British nurses. Thus the Polish school receives an important addition to the teaching facilities which are already available, and indeed in use, in the Royal Infirmary.

PARATYPHOID OUTBREAK IN THE HIGHLANDS

A considerable outbreak of paratyphoid fever has occurred in the counties of Moray, Nairn, Inverness, Ross and Cromarty. The primary wave is largely over and a secondary wave is now expected. The incidence of the epidemic has been greatest in Ross-shire, particularly at Alness, where Bridgend School has been closed. It is thought that the organism has been spread by food rather than by the water-supply, but so far the source has not been identified.

BRITISH ORTHOPÆDIC ASSOCIATION

THE postponed 1940 annual meeting* of this association was held in Oxford on Jan. 3, under the presidency of Prof. T. P. MCMURRAY, when the following short papers were read.

Mr. A. L. EYRE-BROOK and Mr. K. H. PRIDIE (Bristol) had reviewed by clinical and X-ray examination the progress after one year of 47 patients out of 75 treated for *fracture of the neck of the femur* by manipulative reduction and the insertion of a Smith-Petersen nail (Hey-Groves technique). Bony union was proved in 58% of patients and in the whole series of 75 there had been a fatality of 5·3%. Aseptic necrosis of the capital fragment had occurred more often in patients under thirty. The importance of the fracture shaft angle of Pauwels was emphasised. If this angle was low (below 30°) the results from nailing alone were poor and a fibular graft should be inserted as well.

Mr. NORMAN ROBERTS'S (Liverpool) description of the indications for *excision of the patella* was based on a series of 20 cases. He discussed the uses of the patella and emphasised the following points :—

1. Recovery of function after excision is not so rapid as is often thought, though it is more rapid than after suture of the patella.

2. After excision flexion movement is usually full or is possible at least to the right angle ; there is often a limitation of full extension and the quadriceps is often weaker than normal.

3. Excision is advisable in all comminuted fractures in both young and old patients ; and in transverse fractures in middle-aged and old patients.

4. Transverse fractures in young patients should be sutured. If the fragments are very unequal in size it is easier to excise the smaller fragment and to suture the rectus or patellar tendon efficiently to the larger fragment.

5. Derangement of the knee due to recurrent dislocation of the patella cannot usually be cured by excision of the patella.

6. Good results sometimes, but not always, follow excision in osteoarthritis of the knee, particularly if the arthritic changes are mainly in the patello-femoral compartment of the joint.

Mr. G. E. THOMAS (Liverpool) had achieved *correction of scoliosis* in 16 patients ; usually by recumbency on a Thomas frame with longitudinal traction and counter traction applied via the head and legs and three-point pressure on the apex of the convexity and the extremities of the concavity. To exert lateral pressure special pads operated slowly by a screw mechanism of the Thomas wrench type was employed. Failure to achieve correction had occurred in very high and very low curves, in severe long-established curves, and in those cases in which there was gross rotation out of all proportion to the lateral curvature.

* This report was delayed by enemy action.

Mr. W. S. DIGGLE (Liverpool) reviewed a series of *fractures of the external tuberosity of the tibia*. For those cases in which there was gross comminution and depression of the fragments he had found open operation, replacement of the fragments and screw-fixation the most effective treatment. Most of his patients treated in this way had been able to return to work in about six months.

Mr. G. K. MCKEE (Norwich), who spoke on the treatment of *compound fractures of the leg*, advocated fixed skeletal traction on a Thomas splint for both tibial and femoral fractures, simple and compound. For tibial fractures a Steinmann pin was inserted transversely through the upper tibial fragment and through the os calcis or the lower fragment. The pins were fixed firmly, after reduction by manual traction, to the lateral bars of the Thomas splint by a special clamping device. For femoral shaft fractures one pin below the fracture, fixed in a similar way to the Thomas splint, was employed. To avoid undue pressure on the ischial tuberosity or groin the splint was tied to the end of the bed which was then elevated. The advantage of this method, in contrast with the closed-plaster technique, was discussed in the light of its success in 30 compound and 20 simple fractures.

Mr. F. C. DWYER (Liverpool) considered that *Kienböck's disease* is probably due to a fibrosis, resulting usually from trauma, of the dorsal ligaments attached to the carpal semilunar. From an experience of 34 patients, in 10 of whom the damaged semilunar had been removed, Mr. Dwyer felt that conservative treatment offered the best results in a condition which always left a permanently damaged wrist.

Mr. J. Z. YOUNG (Oxford) outlined the preliminary results of the experimental work now in progress at Oxford on *nerve regeneration and nerve grafting* in rabbits. At the start he warned against applying completely to man experimental findings, even though they had been very accurately demonstrated in animals. The need for a qualitative method of comparison between different procedures for nerve repair was emphasised. The rate of growth of new fibres was adopted as a criterion and a method of estimating it developed. The rate for rabbits, found to be about 4 mm. a day, was the same in all nerves and approximately the same at all levels. Certain suture material gave severe reactions—e.g., catgut and pigmented silk. White silk, woman's hair sutures, and fibrin "glue" produced the least reaction. Return of function was often rapid and rapid recoveries occur even after full Wallerian degeneration. They are not due to physiological interruptions such as arise after ischæmia but which clear up even more rapidly. Mr. Young pointed out that the delay between interruption and recovery of a nerve's conduction has three parts :

1. In the junction scar—probably about 20 days in man.

2. In the nerve itself, during the growth of fibres down it, which probably takes place at the rate of 2·5 mm. a day in man. These two phases comprise the anatomical delay.

3. In the muscle—the functional delay—about 40–60 days in man. The delay in the muscle seems to be shorter if the muscle has been denervated only for a short time, a finding strongly in favour of early suture.

The problems of bridging gaps were discussed. It had been demonstrated that nerves could not be stretched suddenly more than 10% of their total length ; and that increase in length from gradual stretching was probably due to growth in length of the nerve rather than to stretching. Autografts had given most success in rabbits and there were some encouraging results from homografts.

MEDICAL SUPPLY ASSOCIATION, Ltd., draw attention in their catalogue to a new electromedical switch-table (Universal Electrostat, series III). This incorporates a metal rectifier and is claimed to have none of the disadvantages of motor generators or valve rectification. A treatment-table (Panapoise) combines maximum stability in all positions with wide range of adjustment and ease in movement of individual sections. Their featherweight Schnee baths are constructed of metal with moulded rubber linings ; they are unbreakable and should prove much easier to handle than the cumbersome earthenware type in common use.

In England Now

A Running Commentary by Peripatetic Correspondents

WE still don't seem to be getting full value from the visiting-team system, and the faults are not wholly on either the hosts' or the visitors' side. When a hospital is threatened with a big take-in it bursts with pride over its unlimited capacity. "Want assistance? Good Lord, no! We can deal with anything. Ask for a visiting team—surgical, resuscitation or nursing? We should think not!" Then when after 48 hours' continuous work they at last send for help the team finds them tired and cross; nobody receives them or tells them what they are wanted for or where things are kept. There is no cup of tea, no handshake. The visiting team, on their part, making no allowances for exhaustion, utter loud criticisms of the lack of welcome, of house-men and nurses, and of the deference which "consulting surgeons" are used to. Keenness is all very well, but no-one is going to do his best work when he is asleep on his feet, and it is mere foolishness to try when relief can be got. The hospital staff—medical, nursing, or lay—should knock off before they are compelled to by sheer fatigue, and those in charge should realise that their job is to foretell when this limit is likely to be reached and ask for help in time. When the team arrives there will then be juniors fresh enough to serve the strangers and make them free of the hospital's resources. The visiting team can help by putting themselves in their hosts' place, mentally as well as physically, and by bringing with them some dog's-bodies of their own, students or probationers, to fetch and carry.

* * *

The lights in the train suddenly went out, and we knew that there was an air-raid in progress, but we ran on at a good pace in the bright moonlight, and I got to my home town only a little late. The station was in darkness, save for the shaded light belonging to the ticket collectors, and so we passed out into the streets to the noise of gunfire, the zoom of planes and the frequent crumps of bombs. There were no taxis, and I did not care at all for the prospect of walking the two or three miles home; so I decided to hurry along to my hospital, which was a good deal nearer, and give a hand in whatever was doing. I caught up with a soldier—an "old sweat"—and we walked in step together. "What a bloody party," he said as a sudden brilliance lit up the sky, and we saw a "Molotov chandelier" dropping down. "That's so-and-so," he went on, pointing to a huge fire behind us, "Jerry knows where he bloody well is." (I found out later that it was nowhere near the important so-and-so.) Our ways parted and he clumped off into the moonlight, with a five-mile walk in front of him.

At hospital no casualties had yet come in, and my houseman took me to the residents' room for tea and toast. One of the other housemen came in from his shift of fire-watching, and we discussed where the fires in the town might be. Then came the news that a casualty had come in, and we trooped down to the reception hall. It was rather an anticlimax to find that he was an old man with a cerebral hæmorrhage. But soon a real air-raid victim came in—a man who, standing at his door watching for incendiaries, had been thrown out into the street by the collapse of the house under a H.E. bomb. He had a fractured tibia and fibula, and he was covered with dust and dirt, his face as black as a coolie's. The next was a middle-aged Roman Catholic priest who, being unable to find a bag of sand in the street, had jumped on an incendiary bomb to put it out and had found it explode as he landed on it. Then came a couple of walking cases—bruised ribs from falling bricks, and a fire-watcher whose tendo achillis had been trodden on by a horse. He sat indignantly in a chair, nursing his sore heel and appealing to me. "Why need the chap have interfered with the rope?" he said. "What chap and what rope?" I asked. "Well, when the bomb fell, I went to get the three horses out of the stable, and I'd got two out all right, and then this fellow comes along and grabs hold of the rope and mucks everything up. He'd no cause to get hold of the rope, I was managing it all nicely." "Were they your horses, then?" I asked. "No, they'd nothing to do with me, you know; but I knew they were there and had to be got out, and I was managing nicely. He'd no cause to get hold of the rope." I looked at his foot, rather for form's sake, because as a physician I know little about these things; obviously he was not badly hurt, only bruised and sore. "Just like another famous chap," I said. He looked at me quizzically; "What famous chap?" "A fellow called Achilles." "Never heard of him," he said, with the generous air of letting me have my little joke, and an obvious relief that things were not beyond a joke.

An air-raid warden white with dust, who had brought in the man with the fractured tibia, then tackled me. "Eh doctor, d'you think there's any chance of my getting my best Sunday tie back again, it's round that first-aid splint? I expect I'll get a George Medal for tying up that leg! But I'd like that tie back again, I feel so untidy without a tie round my collar." Even the fractured tib.-and-fib. on the stretcher ("Records" were just finishing his particulars) had to smile. Then came an elderly woman from the same incident, with great raw gaps of flesh torn out of her arm and leg, badly shocked, with a strange, uncanny look of puzzled questioning. Soon more cases were coming in, and I went along to the resuscitation ward. Already the tib.-and-fib., the priest and the elderly woman were being got into bed and warmed up. More cases arrived in the ward. There was an oldish man with a head wound, his clothes wringing wet, profoundly shocked, dazed and shivering. I never found out why he was soaked, and he could not tell me; but when I gave a hand with the surprisingly awkward task of taking off his wet and clinging trousers, he roused up and said angrily, "Here, what are you doing that for?" Two policemen out of a posse of four who had been sent out to clear the streets round an unexploded bomb were carried in, nearly dead, with the skin blasted from their faces. One of our policemen had been blown a distance of fifty yards or more, and three days later they were still finding in the mass of rubble pieces of uniform and limbs belonging to the other two, as well as the bodies of other poor folk who had been buried. Happily our two constables still survive.

A middle-aged warden carried in a bundle, telling us that it was an unidentified child rescued from what had been a group of modern tenement dwellings. It was a little boy about a year old, his face waxen where it was not black with grime, with a pulpy wound on the back of the head, and a great gash across the forehead. For several hours we watched the baby's life ebb, and then slowly come back again with the appropriate resuscitation measures. An auxiliary fireman came with one of his mates, who had a deep wound into the knee-joint. They had been fighting one of the big fires in the town, playing their hoses from an adjoining building. An H.E. bomb hit their building, and my informant found himself standing on a beam high in mid-air. He grabbed at his pal and held him for a second or two; when the man slipped out of his grasp, he fell on the debris of brick and building and not underneath it, and this saved his life, for three or four other A.F.S. men were crushed to death on the spot. His friend turned to me with savagely clenched fist. "Shooting's too good for That Man," he said.

All this time confident young registrars and housemen, sisters and nurses were getting on with their various jobs, and the emergency theatre was now in action. The tib.-and-fib., the priest, the elderly woman and others were back in bed, recovering from their anæsthetics. I was in the anteroom of the theatre, having a cigarette with my houseman, when suddenly there was a heavy explosion. My houseman dived under the theatre trolley, and rather like a slow-motion picture I dropped on to the floor on my face, listening to what sounded like the roof falling in, and foolishly aware that after all I had not even the cover of the thin aluminium top of the trolley. Then we got up again, and looked around the hospital to see where it had been hit. But it had not been hit; a very heavy bomb had landed on a building across the way. I rushed up to my own wards; glass and dust were all about the corridors, all the windows of one of my wards were broken and some in the other, but the patients were all safe. The night nurses had the situation in hand, the patients were steady and some could even crack a grim joke about it. It was the same throughout the hospital—glass and dust and soot, no casualties and no panic.

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I went back again to the resuscitation ward, which was nearly full. We got some more beds in, and admitted more. The baby with the head wounds did not seem to be rallying. A woman who had been sitting in front of her kitchen fire had been badly burnt on the face, legs and abdomen when the blast of a bomb blew the fire out into the room. A young man, bending over the kettle to make some tea for his old mother had suffered a fracture of the spine when the roof fell in on him. A strapping young soldier, caught in the middle of the town when the raid began, was brought in unconscious after being hit by falling masonry. An old woman had several ribs cracked and a nasty shoulder wound; she died soon afterwards. There were more children, crushed under falling houses. Two old people who were still alive when put into the ambulance were dead when it reached hospital. A couple of young Roman Catholic priests came in and flitted about the ward, doing their offices for the gravely injured and comforting the others of their flock. I came to the bedside of a white-faced, motionless young woman, and felt her pulse. On the other side of the ward the baby with the head wounds started to whimper protestingly under the electric warming cradle—rather a hopeful sound to the professional ear. The young woman opened her eyes and said "Is my baby very badly hurt?" "He's got a nasty gash or two," I replied, "but I think he's going to be all right." A ghost of a smile passed over her face and was gone, and she closed her eyes again. It was her baby, and she too had been dug out of the debris, badly crushed, an hour or two after the child. She still survives, but her baby died thirty hours later.

My colleague the honorary surgeon had arrived, and we went round the beds together, weaving our way in and out of the stretchers which with their occupants were now filling up a large part of the floor. Such cases as were fit for operation in the course of the next hour or two could well be left to the younger men, so we made a tour of the wards. As we were doing this the all-clear went, so we could use our torches a little more freely. The moonlight was streaming in through gaps which had once been windows, making odd glinting patterns on the floors of the wards. Outside it was a lovely night, and some imp of memory flashed on the screen of my mind the scene of Lorenzo and Jessica's love-making:

> Sit, Jessica. Look how the floor of heaven
> Is thick inlaid with patines of bright gold;
> There's not the smallest orb which thou behold'st
> But in his motion like an angel sings,
> Still quiring to the young-ey'd cherubims:
> Such harmony is in immortal souls;
> But whilst this muddy vesture of decay
> Doth grossly close it in, we cannot hear it."

We took a provisional decision on the extent to which the hospital could continue to function, and gave our instructions for the coming day's evacuation of a large proportion of our patients to hospitals elsewhere. Downstairs the work still went on, and would go on well into the afternoon, before the resuscitation ward could be cleared and tidied up and made ready again for the hazards of the next night. There was nothing more for us to do at the moment, and two of the ward sisters who were making a brew of tea called us in to share it. They had both got up and had been busy settling their own patients to sleep in the little corridors leading to the wards, and now all was quiet. We sat over sister's fire and chatted. The blitz had already fallen into its place and proportion in the life of our hospital; for our recollections of the night were not only of torn and crushed bodies, of shattered wards and narrow escapes, but also of old Daddy P., who somewhere about 3 A.M. was found putting his thin legs out of bed. "Here, Dad, where do you think you're going?" one of our party had said to him. The thin legs were slowly withdrawn again under the bedclothes. "I'm sorry," was the sleepy reply. "I thought it was time to get up."

* * *

Your peripatetic correspondent in the R.A.F.V.R. does not give the whole story. Perhaps you would like to hear the other side of it. My main reason for joining was that I liked aeroplanes and I wanted to fly. My biggest regret in life was that I could not get parental permission to join the University Air Squadron at Cambridge. Other reasons for joining were that my fiancée liked the uniform, and that I wanted to do something for the people whom I most admired. I spent the summer at a big recruits' centre doing F.F.I.s and inoculations and a lot of dull but essential work, and admiring the physique and spirit of the bronzed young men drilling on the promenade. My only experience of aviation was a pleasant two days on a high-altitude course at an experimental research station. There is a large pressure chamber there, which holds six people. The pressure can be varied to correspond with any height up to about 45,000 feet. In it the effects of oxygen lack and "the bends" can be studied at first hand.

In the autumn I was posted to an operational station somewhere in the south of England. Here at last I came into contact with pilots and aeroplanes and trained men. It was grand to hear the booming beat of a squadron of Spitfires circling the drome before climbing away to shoot down the enemy (on one day as many as fourteen for the loss of none). Grand to learn all about the planes and their achievements; to climb into them, and eventually to fly in them. My work consists of taking sick parade of about twenty to thirty men (rising to fifty or sixty in the influenza season), who have to be sorted out, and either given stock misturæ or sent to see specialists at the nearest big hospital. I wish I had the service mentality and the strength of mind to order ol. ric. or duty (in red ink) as often as my senior medical officer would. This said S.M.O., who takes sick parade once in six months, and sits in his office writing vitriolic letters all day, becomes something of a public warning. One has to steer the middle course between being a complete "stooge," as the R.A.F. call it, on the one hand, or becoming like him a slave to the rules, refusing to see anyone except at the proper time and on the proper form, and passing one's work on to other departments. At the end of sick parade one sees the W.A.A.F.s, who at least give one the illusion that one is keeping in touch with female ailments. After this there is an interval for a cup of tea and a chat with the other M.O.s, the dental officer, and any officers who may have dropped in for advice. During the morning there are "special sick"—men who have fallen ill since getting up, or who have been injured. There are "sick in billets" occasionally, and the patients in the ward to be seen. Now and then there are air-raid alarms during which one has to retire to a bomb-proof shelter and dressing station, and sit under much concrete and several hot-water pipes awaiting casualties. After a decent lunch interval one comes back and inoculates a score of men, or examines some airmen who wish to become pilots or air gunners, or who have to go overseas. Occasionally one meets some interesting condition, such as Adie's syndrome: and it is always fascinating to detect colour-blindness by means of Ishihara's plates. After tea one is more or less free, unless one is orderly medical officer, when one has to stay on the camp in case of accidents. Sometimes sick quarters echoes with the shout "crash on the drome!" The ambulance springs to life. One leaps in and is driven away furiously, usually to find a plane that has tipped up on its nose or landed with its undercarriage up, and a pilot swearing that he is unshaken and does not want to be examined. Occasionally one is called out at night and told to proceed to the scene of a crash, say five miles north-west of the drome. This is the most unpleasant part of one's job, searching masses of wreckage for bodies, possibly those of people one has known well. Fortunately it does not happen often. Once weekly one does a sanitary round of the camp and makes a report. In my medical education I suppose I am wasting my time. I prescribe stock mixtures and applications for minor complaints; but anything serious is sent to a hospital and whirled into the maw of transference which seems to be the joy of the E.M.S., and contact is impossible to maintain. Where now, I wonder, is that tuberculous epididymitis that possible actinomycosis, that magnificent gumma and that leukæmia that got better so mysteriously? I shall never know. It is six months since I saw an X-ray plate, and I have forgotten what a microscope looks like. Higher examinations are out of the question; but do I care? The aim of everyone in the R.A.F. should be to keep the planes and pilots in the air, and for that end it is my privilege to work.

Public Health

From the Annual Reports

TUNBRIDGE WELLS

Dr. F. C. Linton's report of the borough of Royal Tunbridge Wells is fairly comprehensive. Tunbridge Wells covers 6034 acres, has a population of about 35,000 and in 1939 its birth-rate was 11 9 and its crude death-rate 15 6, which on multiplication by the comparability factor of 0·73 becomes 11·4. Cancer mortality was 2 1 and tuberculosis mortality 0 37. Here we have another "artificial" population, departing from normal in the reverse way to that of Dagenham. Comparison of the two brings out the truth that differences in health statistics which occur naturally in populations of different compositions are much greater than those between the best and worst services, or the healthiest and most unhealthy years and places which are met with in Britain. In the closing years of the last century the age-distribution of all deaths in Tunbridge Wells was roughly: one-fifth under one year, two-fifths between one and 65 and two-fifths over 65 years of age. In 1939 the distribution was: 9 under one year, 164 between one and 65, and 379 over 65 years of age. The infant-mortality rate in 1939 was 21, the lowest recorded in the borough and less than half the average rate of 46 1 for the past ten years. So many districts have recorded infantile mortalities below what we formerly feared was the irreducible minimum that these extraordinarily low rates cannot be due to chance. They are the resultant of low rates for deaths from all the principal causes including malformations.

LIVERPOOL

Fourth in population of the cities of Great Britain, and itself the metropolis of the port of Mersey, Liverpool has always been of particular interest to students of public health, for it was the first place to appoint a medical officer of health and at the outbreak of the present war was the centre of the controversy over the reform of units of health administration. Its population at present is 822,000 but it is not a self-contained unit, being continuous with Bootle on the north and joined to, rather than separated from, Birkenhead by the Mersey. The annual reports of Liverpool have always been comprehensive, and though that of Dr. W. M. Frazer for 1939 is cut down to about half, it is still one of the most complete local reports for that year. Reduction has been steady in all causes of infant death since the beginning of the century, but greatest in diarrhœal diseases, from 57 to 7; in tuberculosis from 6 to 0·8, and in nervous diseases, from 22 to 8·7; the last presumably includes convulsions. The least reduction was in deaths due to prenatal causes, from 51 to 33. Since 1871, the percentage of total deaths due to infectious diseases, other than diarrhœa and influenza, has fallen from 19·2 to 2·7; that of tuberculosis from 13·5 to 7; that of respiratory diseases from 20·2 to 11·1; that of diarrhœal diseases from 10 to 4·5. On the other hand, the percentage of all deaths due to cancer has risen from 1·4 to 12·1. The reduction of deaths from what were formerly called zymotic diseases has been almost regular during the 70 years; that of diarrhœal diseases started only at the beginning of the present century, and that from respiratory diseases only since 1930. This illustrates the course of preventive medicine during the period. Hygienists in 1870 knew that fevers could be prevented; it was not until the severe epidemic of infantile diarrhœa in 1899 that they were convinced that that disease too could be prevented, and the prevention of respiratory diseases, other than phthisis, did not seem to be practicable until modern health practice had made considerable progress. The increase in cancer is admittedly a black spot on preventive medicine, even though the increase is partly artificial, being due in large measure to the higher proportion of old people in the population and improvements in diagnosis. Preventive medicine never assumed that it could prevent us from dying; it was determined to prevent us from dying young and has largely succeeded in doing so. But it did not pay much attention to the aged until recently; at the outbreak of the present war it was considering what could be done to help the aged to die comfortably.

In 1939 there were 8 cases of anthrax in Liverpool; all were treated with serum and all recovered. Only 1 was on the arm, 4 were on the back of the neck and 2 on the temple; in view of this distribution, the success of treatment is remarkable. A comprehensive table of the comparative case-rates of diphtheria, 1933–39, in inoculated and uninoculated subjects brings out that in the uninoculated the annual incidence in persons under 10 years of age was 11·3 per 1000; in the inoculated it varied from 1·5 in those treated by F.T. to 3 in those treated by A.P.T. The numbers are sufficiently large to give significant results. The unfavourable results with A.P.T. may have been due to the "one-shot" method, which has now been discarded. There were 70 cases of cerebrospinal fever, about the average annual number in recent years; the fatality was 40%, the lowest in the past 10 years, but still much higher than what is expected with recent methods of treatment. Encephalitis lethargica has died out; the last notification of an acute case was in 1937 and the last death in the acute phase in 1934; since 1935 there have been 51 deaths of old cases.

SOMERSET

The physiography of Somerset is as diverse as that of any county in Britain, but its industries, though varied, are mainly agricultural. Those who know Somerset will be surprised to hear that, judged from the comparable death-rate, which in theory is a good guide, Street comes out as the healthiest district. Ilminster, which comes out at the bottom of the list, had no infantile mortality, a distinction it shared with Wells and Wellington. The county now has five clinics for mental cases under the Mental Treatment Act, 1930. Although 118 sessions were held, the total number of patients seen was only 73, which leads Dr. Davidson to say that the facilities available are being comparatively little used by practitioners. Neither the general public nor the medical profession has yet got acclimatised to the Mental Treatment Act; this is hardly surprising seeing that the act is but ten years old and reverses what may be called the ideology of mental disease which had been current in the country for centuries. Both patients and doctors are inclined to look on mental clinics as means of getting people into institutions, instead of keeping them out, which is what the clinics are intended for.

BERMONDSEY

Dr. D. M. Connan in his report of this metropolitan borough tells us that 90·8% of fatal cases of phthisis were notified prior to death, but of fatal other tuberculosis only 25% were notified; there were, however, only 4 cases of the latter. In these days, apart from phthisis the only manifestation of tuberculosis in which direct fatality is at all common is meningitis, which for obvious reasons is infrequently notified before death. In Bermondsey the Minister of Health has sanctioned the free supply of insulin by the public-health department to diabetics in poor circumstances; in American cities such a provision is usual and it should be here, but up to the present it has been exceptional. In the obstetrical department there was only one call for the opinion of the consulting obstetrician and none for bacteriological examination. The latest puerperal pyrexia order requires a bacteriological examination of the lochia in all cases notified; but the order was born dead, for it does not say who is responsible for the examination, so it is always somebody else's business and is consequently left undone. In 1939 the infantile mortality-rate fell to the low level of 37, which will surprise those who know Bermondsey, though the rate usually compares favourably with those of other London boroughs. Bermondsey has a solarium for light treatment, electrotherapy and massage. In the first seven months of 1939 the number of persons who received treatment was 1482, and they made 30,693 attendances. Unfortunately the clinic was closed in August and did not reopen until December.

STIRLING

Dr. D. M. Grant, interim medical officer of health, mentions the difficulty which may arise of obtaining sufficient supplies of insulin during the war; we hope this matter is receiving the attention it needs. In September, 1939, Stirling received 2300 evacuees from the Glasgow district. Of these, 827 children were examined at the

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time of handing over to the receiving householders. The result of inspection showed 95 to be verminous, 12 infected with scabies, 94 with septic spots, 48 with dirty bodies, 153 with dirty clothing and 310 with insufficient clothing. This is an exceptionally bad consignment, but it tells us what every medical officer knows full well (and many have been far from inarticulate on the subject) that we are only at the beginning of the social reforms initiated by the medical inspection of school-children in 1907.

BURY

Dr. George Lobban tells us that the average annual rates, in the last five quinquennia, of deaths from pulmonary tuberculosis per 1000 population were 1·18, 0·81, 0·73, 0·59, 0·44. The rate for 1939 (0·36) was the lowest recorded. The population has fallen during the past six years, from 60,100 in 1934 to 58,600 in 1939. During this period the net births were 4533 and the net deaths 5192, giving a natural decrease of 659 out of the recorded decrease of 1470. The number of cases of phthisis notified in 1939 was 31, the lowest in 25 years and little more than a quarter of the number in 1915 (120). Other tuberculosis, on the other hand, has not fallen conspicuously, for the annual average numbers notified in the five quinquennia were 26, 29, 35, 22, 23. The fall in mortality, however, was: 0·31, 0·19, 0·18, 0·18, 0·13. The epidemiology of phthisis is still obscure, differing from that of other forms of tuberculosis and also from that of other respiratory infections. The low phthisis rates and their rapid reduction in Lancashire are two of its most puzzling features.

MACCLESFIELD

In this borough, with an estimated population of 36,350, there were 384 births in 1939. The infantile mortality was 57·2 and the stillbirth-rate 57·3, but the maternal mortality was nil. Dr. J. H. D. Lawrie, medical officer of health, gives the birth-rate as 10·5, the lowest ever recorded. In the four years 1936–39, the stillbirth-rates were very high: 56·5, 55, 70·7, 57·3. The neonatal death-rates were also high: 40·7, 43·0, 31·7, 36·4. The combined rates, which give the mortality of fœtuses carried to viability (97·2, 93, 102·4, 93·7), show a loss of potential lives of 10% which can ill be spared in a town with a low and declining birth-rate.

Two analyses of swimming-bath water, one from a bath used by men, the other from a women's bath, agree in absence of *B. coli* in 100 c.cm. but differ considerably in total counts of aerobes. In the sample from the men's bath the counts were 3700 per c.cm. at 22° C. and 4400 at 37° C.; in that from the female bath, 4 at 22° C. and 3 at 37° C. As *B. coli* is the most resistant organism of its class, its absence ensures the absence of all intestinal bacteria capable of causing disease by ingestion. The rise in the popularity of swimming raised doubt whether the benefits of the exercise might not be offset by the spread of intestinal infections through swallowing bath-water; it is satisfactory to know that this risk can be abolished. We say "can be," and might add "must be," but cannot yet say that it always is.

Infectious Disease in England and Wales

WEEK ENDED MARCH 22

Notifications.—The following cases of infectious disease were notified during the week: smallpox, 0; scarlet fever, 1205; whooping-cough, 4319; diphtheria, 1064; enteric fever, 24; measles (excluding rubella), 14,888; pneumonia (primary or influenzal), 1177; puerperal pyrexia, 123; cerebrospinal fever, 330; poliomyelitis, 8; polio-encephalitis, 0; encephalitis lethargica, 2; dysentery, 128; ophthalmia neonatorum, 83. No case of cholera, plague or typhus fever was notified during the week.

The number of civilian and service sick in the Infectious Hospitals of the London County Council on March 21 was 1797, including: scarlet fever, 238; diphtheria, 337; measles, 428; whooping-cough, 259; enteritis, 26; chicken-pox, 109; erysipelas, 38; mumps, 1; poliomyelitis, 1; dysentery, 39; cerebrospinal fever, 80; puerperal sepsis, 7; enteric fevers, 2; german measles, 12; glandular fever, 2; other diseases (non-infectious), 88; not yet diagnosed, 110.

Deaths.—In 126 great towns there was no death from smallpox or enteric fever, 2 (0) from scarlet fever, 36 (2) from whooping-cough, 21 (0) from measles, 44 (4) from diphtheria, 38 (2) from diarrhœa and enteritis under 2 years, and 116 (9) from influenza. The figures in parentheses are those for London itself.

Liverpool reported 5 deaths from whooping-cough and in the same week at Glasgow there were 14, Liverpool had 6 fatal cases of diphtheria, and Wolverhampton 4. There were 8 deaths from influenza at Bradford and 7 at Birmingham.

The number of stillbirths notified during the week was 228 (corresponding to a rate of 41 per thousand total births), including 16 in London.

Parliament

PARLIAMENT has spent a humdrum but useful week. The royal assent was given to the War Damage Act which should do much to help those who have suffered through air-raids. It is not often that the House of Commons goes into the division lobbies in these days of the party truce, but members did so last week on the New National Service Bill, which seeks to introduce compulsory recruitment for the civil defence services and to amend certain amendments of the National Service (Armed Forces) Act where experience has shown it to be necessary. Mr. ERNEST BEVIN in moving the second reading explained that compulsion was necessary because of the shortage in certain districts of whole-time workers for civil defence. But the original conception of the citizen force remains unimpaired, and has been fortified by the response of volunteers all over the country. Men liable for service in the armed forces and men registered as conscientious objectors on condition that they take up civilian work under civilian control will become liable for civil defence service. Women are not included in the bill. It was proposed to draw mainly from men over 30 or possibly 35 years of age, and there was also a suggestion to review the cases of men who had been placed in medical grade 3 but who might be quite capable of giving civil defence service. Mr. C. G. AMMON and Mr. E. HARVEY paid tribute to the steps the Government had taken to protect the citizen's rights of conscience even when it believed that conscience to be mistakenly informed, but Mr. MCGOVERN denounced the bill in a speech which Mr. L. SILKIN described as "interesting, abusive, irrelevant and muddle headed," and when the division took place 176 voted for the second reading and only 4 against. Mr. Maxton and Mr. McGovern acted as opposition tellers.

Evacuation Debts

When the Liabilities (War-Time Adjustment) Bill was read a second time in the House of Lords the Lord Chancellor explained that the shifting of the population had placed many honest people in a position of extreme financial difficulty. Innocent people, such as doctors whose patients had moved elsewhere, were subject to an immediate financial strain. The remedy as prescribed in the bill is to set up simple machinery to bring together the debtor and his creditors. Lord SIMON said that the long-sighted creditor—to say nothing of the merciful creditor—would see the advantage of making a bargain from which he does not get twenty shillings in the pound. One of the difficulties of leaving such cases to voluntary action was that a creditor who is willing to compromise may be chary of making an agreement while other creditors are free to exact the full payment. The bill provides for the appointment in each district where it is deemed necessary of a liabilities-adjustment officer whose services should make it unnecessary for most cases to go to the court.

Kitchen Waste

In the House of Lords on March 19 Lord DAVIES called attention to the deplorable fact that even now, after eighteen months of war, only some 40% of the kitchen waste of the urban population is salvaged and turned into feeding material for pigs. Taking as a basis the results obtained by the Tottenham local authority he showed that a group of urban authorities, including Sheffield, Huddersfield, Croydon and Wembley, collected during the month of January a bare 42% of what they might have salvaged. Nor did the Government spokesman deny the urgency of the problem or criticise the figures brought forward by Lord DAVIES except by putting the total possible salvage a little lower. He admitted that "it must be a very bad thing at this time

if we are only able to collect 50% or 60% of the refuse of this country." This is no academic problem, for the loss of kitchen waste represents potential pigs and poultry. One ton of the salvage product in Tottenham, it is estimated, would feed one pig for one year, and if the whole of the urban authorities collected it with equal diligence the salvage would suffice to maintain half a million pigs or one-seventh of the prewar population of pigs. Putting it another way we can say that such salvage is equivalent to one-sixth of the prewar importation of animal feeding stuffs. Now owing to the difficulty of importing such feeding stuffs animals are being slaughtered and there is already a shortage of first-class protein.

Of course it may be argued that there should be no kitchen waste and the thing to do is to educate the "openhanded British public," as Ruskin called them, to cut out their kitchen waste. Dr. G. E. Friend in "The School Boy" points out that the table wastage at Christ's Hospital became vanishingly small during the rationing years 1917–19 and that by training in that school it is as low as 1% even in more prosperous times. And be it remembered that puberty is a wasteful age. We have, however, to take things as they are, and while it may be admitted that the public as a whole, including the Services, need education in preventing wastage of food, it is none the less wrong not to put what wastage there is to the production of home grown food material.

In the same debate Lord BLEDISLOE expressed a fear that still further wastage of food material would result from the avowed policy of the Ministry of Food of diverting a portion of the fluid milk to the manufacture of cheese. From a dietetic point of view it would be much better if the whole of the fluid milk of the country were used as fluid milk. Unfortunately the convenience of cheese and its keeping properties must weigh against its smaller food value than that of the milk from which it is manufactured. It is difficult to convey milk down a coal-mine or into the fields, nor would it be easily possible to persuade miners and agricultural labourers that milk is as satisfying as cheese. None the less the loss is a considerable one. Most of the lactalbumin and lactose of the milk together with some protein split from the caseinogen is apt to be lost in cheese manufacture. In the past it has been largely lost by turning the whey into the sewers. The effluent from cheese factories has in fact proved as detrimental to the live-stock in our rivers as crude sewage, for it is an admirable pabulum for micro-organisms which rob the water of its oxygen. All this waste protein, approximately 1% of the whey, and the lactose (4%) can and should be recovered. There are manufacturing plants in this country which have produced dried whey for human consumption and if in peaceful times these products made little headway it is essential that we should use them now, especially in view of the lack of first-class protein in our war-time dietary. All skilled manufactories find a use, often a very profitable use, for their by-products.

The Budget

The Chancellor of the Exchequer will open his budget on the first sitting day of the House of Commons after April 6.

QUESTION TIME

Coroners and Air-raid Casualties

Major J. MILNER asked the Home Secretary whether he was aware that coroners' inquests were not now being held in the case of casualties apparently due to air-raids; that administration of the new procedure was in the hands of mortuary attendants usually without any special qualifications or experience; and whether, having regard to the difficulties arising in regard to identification and other matters, and to the possibility of deaths by violence other than by air-raids being undiscovered, he would consider reversion to the system of coroners' courts with any necessary modifications.—Mr. HERBERT MORRISON replied: In view of the impossibility of arranging for a coroner's inquest in every death due to war operations, a defence regulation was made at the outbreak of war which placed on the clerk of the local authority the responsibility for certifying to the registrar that death was due to war operations. There is a responsibility on the local authority to see that the superintendents of mortuaries are competent persons; and unless it is clear that the death was due to war operations the case must be referred to the coroner for investigation. The question of making special provision in cases where there are difficulties of identification has recently been under the consideration of the Government, and by a new regulation which came into force on March 14 provision has been made for special inquiries by the coroner in such cases.

Distribution of Medical Man-power

Mr. T. E. GROVES asked the Minister of Health what procedure was adopted by the Central Medical War Committee and the local medical war committees in order adequately to decide the relative claims for doctors of the armed forces and civilian practice.—Mr. E. BROWN replied: The procedure adopted by these committees in selecting doctors for recruitment to the Forces provides for a full investigation in each case of the needs of civilian practice. The local committee invites representations both from the doctor himself and from interested parties, such as his partners, or, if he is an assistant, his principal, a hospital or any public authority by whom he is employed, and, if he is an insurance practitioner, the insurance committee. These recommendations are fully considered and if so desired are made orally. If the local committee recommends recruitment, objecting parties may make representations to the central committee in the same way.

Alien Doctors

Sir HENRY MORRIS-JONES asked the Minister whether, as the present arrangements for allowing alien allied doctors in this country to help in the joint cause by becoming temporarily registered medical practitioners were slow and unsatisfactory, the committee which made these recommendations would now accept, and recommend, the names sent to them by the allied government concerned in London.—Mr. BROWN replied: The Central Medical War Committee, which acts as a clearing house for supplying alien doctors to hospitals and other authorities desiring to employ them, has received a large number of names from various sources and will, of course, be glad to receive others from the Allied Governments concerned. The procedure necessarily took some time to set in motion, including as it does the steps necessary for registration with the General Medical Council and for satisfying the general requirements relating to aliens. I am informed that it is now working smoothly.

Impure Milk at Newcastle

Mr. DAVID ADAMS asked the Minister whether he was aware that samples of undesignated milk collected and submitted to bacteriological examination by the Newcastle-upon-Tyne corporation during last month, showed: satisfactory 15, unsatisfactory 14, total 29; and what steps were being taken to improve the quality of this class of milk supplied for food into the Newcastle area.—Mr. BROWN replied: I have received recent reports on samples from the corporation though I cannot identify the particular figures referred to. Local investigations have been made and I understand that as a result more effective supervision is likely to be secured.

After-care of Tuberculous Patients

In answer to a question Mr. BROWN said: According to the latest information in my possession, 121 tuberculosis authorities out of 174 in England and Wales have made aftercare arrangements. The number of new cases attending dispensaries is well maintained in urban areas, having regard to the effects of evacuation from those areas.

Actinotherapeutic apparatus embodying some interesting new features is described by HANOVIA in their catalogue. The model VI (type 220) Alpine Sun lamp has a self-starting arc-tube with greater ultraviolet emission than the older standard model. Constant intensity of output is maintained by rheostatic control. With this type of high-pressure mercury-arc burner a smaller tube is used, the cost of apparatus and running expenses are reduced and replacements are simplified. The telescopic pillar and well-designed control unit give greater ease in the adjustment of the apparatus. A new Kromayer lamp, model V, embodies improvements on earlier models. The burner starts automatically and can be operated in any position. An intensity-stabiliser ensures constant output, and greater intensity of ultraviolet emission is secured by operation at higher pressure.

Letters to the Editor

FEEDING OF THE YOUNG

SIR,—That the feeding of the young is difficult under rationing no-one will deny. A little calculation will show that to give them adequate amounts of first-class protein is almost impossible for the great majority of the nation. Let us assume that the League of Nations figure of 60 g. of total protein per day for the child of 9-10 years is reasonable. Of this a definite proportion should be first-class protein. Even those who deny the necessity for first-class protein in the diet of the adult admit that growing animals do better on first-class protein than on vegetable and cereal proteins. I have seen young laboratory rats on casein show double the rate of growth the controls showed on the same amount and proportion of wheat gluten. There are no adequate data concerning how much of the 60 g. should be first-class protein. I am assuming half—i.e., 30 g. If a child gets his full ration of meat, his aliquot share of the milk produced in the country, his ration of bacon and cheese, and in addition one egg and about 1 lb. of fish per week his total first-class protein will, it is true, be over 30 g. a day. Thus:

	(g.)
2 oz. meat (taken as raw beef steak)	11
⅔ pint milk	12
½ oz. bacon	2·3
½ oz. cheese	1·1
½ egg	1
2½ oz. herrings	6·6
	34·0

In this calculation the figures have been weighted in favour of obtaining the requisite amount. For example, if mutton chop, as purchased, is substituted for beef steak the value of the meat sinks to 4 g. (with scrag end it would sink still lower wiping out the surplus and bring it to a deficit. If more than ⅔ pint of milk is taken someone else has to have less; there is not enough milk produced to give more. We thus see that a middle-class child of 9–10 years, unless his parents go to the extravagance of more eggs, white fish, game and poultry, will only just cover the assumed need. What the deficit for his older brothers and sisters will be can be imagined and we cannot offset his younger relatives against them, for their needs are proportionately greater. Now if middle-class children are likely to suffer deficit, how much more will the children of the poorer classes suffer. The position is more than disturbing. I may, it is true, have overestimated the need for first-class protein, or imagined the middle-class folk too thrifty with eggs and fish, but that still makes one doubt whether the working classes will get enough first-class protein for their children and fear that after the war we shall meet with a lowered stature and physique of the rising generation which will take, as it did after the war of 1914–18, many years to wipe out.

The remedies are free milk in the elementary schools, cheap milk for the young up to 18 years of age, and a voluntary sacrifice by the adults of their ration of first-class protein in favour of the young.

V. H. MOTTRAM.

King's College of Household and Social Science.

A HUNDRED CASES OF BREECH PRESENTATION

SIR,—Professor Claye asks what useful purpose is served by our article on breech presentation in your issue of March 1. One obvious answer is that it was written with provocative intent to stimulate discussion of a problem on which, despite its antiquity, the last word has not been spoken. In this, at least, we have succeeded. Like Mr. Walker we want to know, and no less than Professor Claye we deplore the sketchiness of the case-notes; but we cannot be held responsible for the sins of omission of a long series of harassed and probably overworked hospital residents. No doubt they order these things better in Leeds. We described case 3 as "alleged contracted pelvis" for the excellent reason that these were the actual words used in the hospital notes. This paper was not based on a planned investigation, in which accurate notes would have been kept from the outset; it was written with the idea that the recording of some honest facts, representing perhaps a fair average of obstetric practice in this country, would be both salutary and instructive. Many of these patients come from widely scattered country districts and the notes date back for several years. It was not feasible to trace and interview all these women, nor did we feel that the omission of the unknown factors mentioned by Professor Claye altered the issue, since there was no reason to suppose that they differed materially in the two series.

The treatment of 26 out of 64 cases by cæsarean section can scarcely be described as "wholesale resort to laparotomy," and the reason that the hydrocephalic was so delivered was that, regrettably enough, it was not diagnosed as such. We did not state whether the classical or lower uterine segment operation was employed in any particular case because we did not consider the type of operation relevant to the issue. In point of fact the classical operation was performed in every case. In discussing the subject we do not pose as authorities, nor do we hold any final brief for a particular method of treatment; but we are concerned with facts and not with impressions. Professor Claye tells us that version at the 34th week is usually easy; it would be interesting to know, if he can tell us, what proportion of breeches diagnosed at the 34th week turn spontaneously if left alone. He tells us that, as a result of version under anæsthesia, a certain (unspecified) number of placental separations will occur, that breech delivery per vaginam "remains the best treatment for most cases" and that cæsarean section "though technically easier kills more mothers." Without substantiation these statements are mere expressions of opinion. Could not Professor Claye furnish us with the facts and figures from his own experience on which he bases these assertions?

Dr. Violet Russell has formed the impression that most practising midwives would get a fœtal mortality in breech cases much lower than 25%. Until we came to examine the figures we thought our mortality was less. We would emphasise, however, that our fœtal-mortality figures are quite "uncorrected," and include not only stillbirths but also deaths within a few hours of delivery, whereas in many papers on the subject the fœtal mortality has been "corrected" according to the whim of the author concerned. Moreover we cannot accept with complacency the "unavoidable" fœtal mortality to which Dr. Russell refers.

Mr. James Riddell, though he gives us no figures, contributes much wise advice on how to determine the best method of treatment in any given case. He does not share Dr. Russell's misgivings about abdominal scars, which he thinks are to be preferred to the damage to the genital canal which may follow a difficult vaginal delivery.

In his valuable letter Mr. J. W. Burns has misinterpreted our sentence "maternal mortality in this series was nil, infant mortality 10." This refers to the whole group of 53 hospital cases remaining after deducting the 11 cases treated successfully by version. The figure 10 which should, in fact, read 9 (the error was ours) is the actual number of fœtal deaths in this group and not a percentage mortality figure. In quoting our statement "if version fails then cæsarean section is the treatment of choice," he omits our provisos which bring our tentative opinion very nearly into line with his own views. His observation on the hazards and difficulties of external version are in interesting contrast with those of Professor Claye. With regard to his helpful figures on fœtal mortality in breech presentation, we should like to know if they have been in any way "corrected"; in any case it may be noted that, although Mr. Burns's fœtal-mortality figure for vaginal delivery is decidedly better than ours, it is still more than double that for his own series of cases delivered by cæsarean section.

In conclusion, we can assure Professor Claye that we all take a real pleasure in our obstetrics; we only wish that our experience of breech delivery gave us greater cause for pride.

ALAN GAIRDNER,
MARGARET HADLEY JACKSON,
L. N. JACKSON.

Crediton.

THE NEUROLOGICAL APPROACH TO MENTAL DISORDER

SIR,—At first sight I doubted the necessity for discussing Group Captain Symonds's article. The fanciful picture there drawn of the medical psychologist—a designation which is not a product of this century, coupled with the devastating description of the training of the "sound psychotherapist," calls however for comment. The postgraduate teaching at the Tavistock Clinic, for which I can speak, has, however imperfectly, been evolved in order to obviate the very situation, amateur and dangerous, which Group Captain Symonds is advocating. His ominous sounding but undocumented criticisms of the results of psychological treatment mean just as much as the statements which we could all make about patients misdiagnosed and mishandled by neurologists.

Something more constructive is happening in the United States. The *American Journal of Psychiatry* of January, 1941 (pp. 780–804), reports a discussion at the American Psychiatric Association, attended by the heads of the research foundations, Dr. Adolf Meyer and many others, on present-day trends in neuropsychiatric research. One may perhaps usefully abstract three points from the chairman's summary of that discussion :—

5. Neuropsychiatrists need to be not only psychologically trained, but should be better oriented in the basic sciences.

6. Conversely, internists and pediatricians need a psychologic orientation.

7. In the field of psychotherapy there is need for postgraduate schools to teach and test the various psychotherapeutic methods. Such schools should be established under university ægis.

In the discussion a curriculum of three or four years was suggested for training in psychotherapy. Most psychiatrists in this country will be inclined to agree with the American opinion.

Wimpole Street, W.1. J. R. REES.

SIR,—Since Group Captain Symonds has elected to use the occasion of a presidential address, when debate is barred, for his assault on the psychological approach to mental disorders, he compels some of us to take up your valuable space. He also betrays thereby the weakness of his position, one of increasing isolation from modern medical opinion, even in his own specialty.

The spectacle of the organic neurologist, with his interest focused on the purely material substratum of nervous—not even mental—phenomena, still claiming the sole prerogative to conduct psychotherapy by the magical virtue of his "sound training" in reflex levels is almost pitiful in this year of grace. He is himself compelled to admit that human understanding and values are the keys to this branch of healing; but in the next breath denies them the right to a special discipline and method of their own. We all know how sterile the organic approach, with "bromide and a sea voyage" as the chief therapeutic standby, has been. And we can also imagine the uproar in the neurological camp if a psychotherapist had the temerity to stand up and proclaim that a knowledge "of a few fundamental principles" of anatomy of the C.N.S. and the ownership of a reflex hammer made him a competent neurologist.

As to theory, Dr. Symonds is in the position of a man trying to convince us that the quality of music will be understood by patient investigation of the physics of horse-hair scraping on cat's intestine. With this conclusion Sir Charles Sherrington, according to his latest book, appears to be in complete agreement.

London, S.W.1. H. V. DICKS.

SIR,—Several of your readers have expressed the hope that I will take formal exception to what they regard as a psychologically "reactionary" article. Although I sympathise with their indignation, I do not feel called upon to enter the jousts on their behalf. After all, Group Captain Symonds is entirely within his rights in endeavouring to describe what he calls a neurological approach to mental disorder, even if by his use of the term "mental" he cuts the ground from under his own feet. In any case it is common knowledge that whereas the stress of war usually contributes to the advancement of science it likewise calls from their sleepy Victorian hollows many a Rip Van Winkle. Nor does Dr. Symonds's brief but inglorious incursion into medical psychology call for any particular comment. This is evidently a subject concerning which he knows little and cares less. On the other hand his open incitement to the practice of psychotherapy by unqualified persons is a more serious matter. Here, to say the least of it, is an indiscretion which should not have exceeded the limits of privately expressed prejudice. Just in case any of your readers should regard his statement as authoritative, I should like to draw attention to the fact that it is the fixed policy of all recognised psychological institutes to insist on increasingly stringent standards of qualification. In the case of the Institute of Psycho-analysis, for example, this involves a minimum of four years' training, particulars of which can be had on application to the secretary's office.

Gloucester Place, W.1. EDWARD GLOVER, Director, London Clinic of Psycho-analysis.

SIR,—In his presidential address Group Captain Symonds gave persuasive expression to a number of very controversial opinions. His views have already been challenged by several of your correspondents. Their criticisms seem to me to be, for the most part, sufficiently pertinent to allow one to hope that Dr. Symonds will think fit to reply, despite the tradition that a presidential address is immune from discussion. In this hope I venture to submit a few further questions.

Dr. Symonds says "sleep is controlled by a compact and localised mechanism in the hypothalamus. When this is disturbed sleep is disordered." Would he proceed to state that when sleep is disturbed the localised mechanism is necessarily disordered? If so how does the localisation of the mechanism affect the treatment?

Again, let me submit the following typical case. A woman washes her hands twenty times a day. She consults a present-day neurologist. After careful examination he pronounces her as being "organically sound" and recommends her to seek treatment at the hands of a medical psychologist, adding—paradoxically enough—that her trouble is all due to her "nerves." The assumption is therefore justified that this particular affection of the "nerves" is beyond the frontiers of present-day neurology. I am concerned to know from Dr. Symonds

1. Whether the neuropsychiatrist of the future will still tell the patient that it is all due to her "nerves."

2. Whether he will treat the case himself (seeing that there will be no more medical psychologists).

3. Whether, in that case, he will attempt to "lay bare the patient's spirit."

4. And, if so, will his chances of therapeutic success rest exclusively on his personal, apart from his professional, qualifications?

Dr. Symonds has laid us all under a debt for his brilliant and learned address. I, for one, would be further indebted to him for answers to these questions.

London, W.1. H. CRICHTON-MILLER.

SIR,—The concept of the unconscious has been accepted by most lay and medical psychologists as a valuable and even necessary hypothesis. Despite many connotations, it has played a central part in the development of modern psychology and psychopathology. Surely no psychiatrist nowadays questions the fact of unconscious mental life. Group Captain Symonds says that the "gap between psychology and physiology is still so wide that it is beyond imagination to pass it"; and asserts that "unconscious activity for the neurologist means physiological activity and no more." The neurological approach to mental disorder would seem to have nothing to offer the psychiatrist. What can the neurologist say of hallucinations, phantasy, dreams, memory? Are they related to "the anatomical substrata of consciousness" or are they an indication of "unconscious cerebral function?" And, if so, are we much further on?

We are told in this paper that some medical psychologists—the modest ones—claim that it is because of their technique that they are successful. If this claim could be supported, then any intelligent person, having

been told how, could be a successful psychotherapist. It is not quite so simple as that. Yet the author goes a stage further when he maintains that the sound psychotherapist in addition to having the qualities of a good doctor needs only "the aid of personal experience and a few fundamental principles to guide him." The "few fundamental principles" is the rub. Even if we could define them to our own satisfaction they might well prove to be a hindrance in the hands of another. Group Captain Symonds holds that the gap between neurology and psychiatry, unlike that separating psychology and physiology, is narrower than it has ever been. But neurology, as here depicted, and psychiatry (including medical psychology) seem to have nothing in common. Indeed the link between psychiatry and disorders of the circulatory or digestive systems is more obvious than that between psychiatry and neurology.

E. A. BENNET.

PRICE OF INSULIN PREPARATIONS

SIR,—You were good enough to publish recently a plea for the use of the stronger solutions of insulin (40 and 80 units per c.cm. instead of 20 units) on the ground of national economy: fewer bottles would be needed, less packing and less labour. Now the price of insulin has, I suppose inevitably, been raised to cover increased costs and the argument of personal economy has been added. The following figures show that the retail increase is much greater in the weakest solution of insulin and that the increased price can be largely offset by changing to more concentrated insulins.

Strength. Units per c.cm.	Cost per 100 units of soluble insulin	
	Old price	New price
20	1*s.*	1*s.* 5*d.*
40	11½*d.*	1*s.* 2*d.*
80	11*d.*	1*s.* 0½*d.*

It is clear that the increase in price can largely be avoided by using the stronger concentrations in appropriate dosage.

Harley Street, W.1. R. D. LAWRENCE.

DIAGNOSIS OF TUBERCULOSIS

SIR,—The letter of Dr. Sinclair R. Wilson in your issue of March 22 contains some statements which appear to me contrary to generally accepted opinion. While all clinicians would agree that it is wrong to apply the label tuberculous without careful assessment of clinical, pathological, and radiological findings, I find it hard to believe that in army recruits the commonest cause of hæmoptysis is bronchiectasis. From general experience soldiers invalided out on account of tuberculosis usually have fairly definite and in many cases extensive disease. Pulmonary infarction from mitral disease presents clinical features sufficiently definite to make the diagnosis easy. Idiopathic pleurisy with clear lymphocytic pleural effusion must still be regarded, in the majority of cases, as of tuberculous origin, though obviously every means such as sputum examination, culture of the fluid and serial radiography should be employed to establish the diagnosis. Most clinicians will have seen many cases of frank pulmonary tuberculosis which have given a history of pleurisy with or without effusion, even when complete examination of the fluid failed to reveal tubercle bacilli. Those who are meticulous enough to employ gastric lavage for the investigation of suspected cases of tuberculosis are unlikely to do so without good reason, and therefore this is not the only criterion on which the diagnosis is being based.

While I am in complete agreement with Dr. Wilson that the diagnosis of tuberculosis should not be made on insufficient grounds, it is surely a dangerous practice to relegate tuberculosis to third place in the causation of hæmoptysis in young army recruits.

County Sanatorium, Harefield, Mdx. JOHN C. ROBERTS.

DEDUCT MISFITS AT SOURCE

SIR,—One of the most popular ways of wasting public money at present is for medical boards to pass into the Army men with definite disabilities, physical or mental. I do not suggest that the boards are either careless or incompetent. Evidently they have neither the time nor the facilities for the full investigations necessary to prevent these mistakes. Yet the investigations have to be made sooner or later. Often it is later, after much money has been spent in equipping the man, attempting to train him, or find some work that he is fit for, or sending him to this and that hospital or specialist (at the cost of untold "ambulance-miles"). Finally vast quantities of paper and time are expended by all sorts of people, important and otherwise, in getting him discharged. Is it worth it?

Granted that the present boards have a lot of men to examine in a limited time, but why not have more boards? It will be objected that there are not enough doctors. But there are—hundreds. They wear expensive uniforms and sit at wooden tables trying to cope with the chronics which have been missed by the boards. Let us have more civilian boards with plenty of time to consider each case. They need not be large, or composed of highly experienced practitioners, but they should have the best possible facilities for obtaining specialists' opinions. Given clear instructions as to what is expected of them, even the least experienced doctors are capable of passing the obviously fit men and referring the doubtfuls to their more senior colleagues. Surely this would be more economical than the present system, though perhaps less impressive as regards the rate of intake into the Army.

Brancepeth, co. Durham. W. E. HICK.

TOXICITY OF SULPHATHIAZOLE

SIR,—It was with considerable interest that I read your annotation of Jan. 11 (p. 49) concerning the investigations of S. Moeschlin and H. Hurschler (*Schweiz. med. Wschr.* Oct. 12, 1940, p. 972). These workers reported the presence of toxic granules in red blood-cells of subjects getting sulphonamides other than sulphathiazole. On the basis of these findings it was thought that sulphathiazole was probably less toxic to red blood-cells, although the reason for this remained unexplained.

Recent studies by our committee for the study of pneumonia at the Philadelphia General Hospital (see Reinhold, J. G., Schwartz, L., Flippin, H. F. and Bethlahmy, S. *Proc. Soc. exp. Biol., N.Y.* 1940, **45**, 317) furnish a logical explanation for this finding. Thus, whereas sulphanilamide and to a lesser extent sulphapyridine penetrate red cells readily, this is not the case with sulphathiazole. We have found that sulphathiazole shows a marked disproportion between concentrations in cells and plasma when analysed by the method of Bratton and Marshall. In 13 convalescent patients the mean ratio of whole blood free sulphathiazole to serum free sulphathiazole was $0{\cdot}74 \pm 0{\cdot}09$ standard deviation. Ten patients treated with sulphapyridine showed a ratio of $0{\cdot}89 \pm 0{\cdot}07$. This difference between the drugs is highly significant. When the concentration of sulphathiazole in the blood-cells was calculated, the ratio to the concentration in blood plasma was $0{\cdot}437 \pm 0{\cdot}19$ as compared with $0{\cdot}645 \pm 0{\cdot}18$ for sulphapyridine, likewise a significant difference.

Philadelphia General Hospital. LEON SCHWARTZ.

Obituary

EDWARD MEREDYTH MIDDLETON

O.B.E., M.B. TORONTO, M.R.C.S.; COLONEL, R.A.M.C.

Colonel Middleton, who was killed on active service in March, was the eldest son of the Rev. F. E. Middleton, rector of Haynford, Norfolk. He was born in 1880 and educated in Canada. After graduating M.B. Toronto in 1905, he returned to England and the following year took his English qualification from St. Thomas's Hospital. He obtained a commission in the R.A.M.C. at the beginning of 1907. He was taken prisoner early in the last war and a fellow officer who shared his year's imprisonment has said "the breadth and depth of a man's character was searched in such circumstances. It is enough to say my affection for him was deepened at the end of what seemed to be an interminable incarceration." Middleton afterwards served in Macedonia and in Palestine, and he was twice mentioned in dispatches. He retired in 1927 with the rank of colonel and was appointed officer in charge of the reception station at

Chiseldon. At the outbreak of this war he rejoined and was appointed an A.D.M.S.

Fruity Middleton, as he was known to his friends, was an attractive and genial personality, yet when he felt a course was right he had the courage of his convictions. He was well versed in the administrative problems of the army and the welfare of the soldier was safe in his hands.

ARTHUR DOUGLAS WEBSTER

O.B.E., M.D. MCGILL, D.SC. EDIN., F.R.C.P.E.

Dr. Arthur Webster who died in Edinburgh on March 15 at the age of 85, was born in Nova Scotia and educated at Montreal. He graduated at McGill University in 1878 and shortly afterwards went to Edinburgh where he took the Scottish conjoint qualification. In 1884 he was elected a fellow of the Royal College of Physicians of Edinburgh, and four years later he obtained his B.Sc. in public health at Edinburgh University. He practised as a physician in the city for nearly 60 years. Before the last war he was medical officer of the 4th battalion Royal Scots (Queen's Edinburgh), and in 1914 he became medical officer to the 1st Edinburgh battalion (Kitchener's Army) 15th Royal Scots, and afterwards to the 16th, 17th, and 18th battalions during their mobilisation. He described his experiences in "Kitchener's Army" and was awarded the O.B.E. for his services. Dr. Webster's wife died eight years ago, and he is survived by two daughters and two sons, the elder of whom is Dr. J. Douglas Webster, director of the institute of radiotherapy at the Middlesex Hospital.

Appointments

BEADNELL, LOUIE L. M., M.R.C.S.: asst. M.O.H. for Barking.
CRONIN, J. D., M.B. Lond.: resident asst. registrar at the Royal Free Hospital, London.
HARVERSON, E. S., M.B. Lond.: R.S.O. at St. John's Hospital, Lewisham.
HOROWITZ, W. E., M.D. Vienna: house-officer at St. Mary's Hospital for Women and Children, Plaistow.
LEWIS, MAURICE, M.R.C.S.: asst. M.O.H. for Barking.
LIPMANN-KESSEL, A. W., M.R.C.S.: R.M.O. at the Royal Cancer Hospital (Free), London.
NAZ, L. P., M.R.C.S.: resident surgeon at Grove Road Hospital, Richmond.
O'CALLAGHAN, DESMOND, M.B. Lond.: R.S.O. at Grimsby and District Hospital.
ROB, C. G., M.Chir. Camb., F.R.C.S.: resident asst. surgeon at St. Thomas's Hospital, Godalming.
SCOTT, T. H., M.B. Edin., late Colonel A.M.S.: physician superintendent at the Princess Louise Scottish Hospital, Renfrewshire.
SHARPE, DOROTHY A., M.B. Lond., F.R.C.S., M.R.C.O.G.: obstetric surgeon to the Royal Free Hospital, London.
THOMPSON, SOPHIA M. R., M.B. Edin.: temp. asst. M.O. (civil defence) for Stratford.
WENGER, R. A. L., M.A. Camb., F.R.C.S.E.: general S.O. at Woodend and Old Mill Hospitals, Aberdeen.

Births, Marriages and Deaths

BIRTHS

CARTER.—On March 23, at Londonderry, the wife of Surgeon-Lieutenant B. M. F. Carter, R.N.V.R.—a son.
HUGHES.—On March 25, at Woking, the wife of Dr. Stephen Hughes—a son.
RAPER.—On March 22, at Salisbury, the wife of Major Alan Raper, R.A.M.C.—a son.
TEARE.—On March 29, at Windsor, the wife of Dr. Donald Teare—a daughter.
WIENER.—On March 29, at High Wycombe, the wife of Mr. R. A. Kilgour Wiener, F.R.C.S.—a daughter.

MARRIAGES

BALLANCE—ANSTIE.—On March 29, at Speen, Gerard Alaric Ballance, M.B., to Bridget Mary Anstie.
CASSON—COOK.—On March 26, at Kampala, Arthur H. Casson, M.R.C.S., to Clarice E. Cook.
NEUSTATTER—CLUTTON-BROCK.—On March 29, at Tandridge, Walter Lindesay Neustatter, M.R.C.P., to Mary Alice Clutton-Brock.
PAULLEY—GAVIN-JONES.—On March 2, at Oxford, Probationary Officer J. W. Paulley, M.B., R.A.F., to Deirdre Gavin-Jones.
WIGGINS-DAVIES—GILBERT.—On March 29, at Chelsea, Walter Wiggins Wiggins-Davies, F.R.C.S., to Ann Destine Gilbert.

DEATHS

GROSVENOR.—On March 25, at Stevenage, Herts, Alfred Augustus Grosvenor, M.D. Dubl.
MACDONALD.—On March 29, at Bridge-of-Allan, Stirlingshire, John Smyth Macdonald, B.A. Camb., L.R.C.P.E., F.R.S., aged 73.
MCDOUALL.—On March 25, at Honiton, Devon, John Crichton Stuart McDouall, O.B.E., M.R.C.S., D.T.M. & H., sometime director of medical sanitary services, Sierra Leone.

Medical News

University of Sheffield

At recent examinations the following were successful:—

M.D.—M. B. Brody.

FINAL EXAMINATION M.B., CH.B.

Parts II and III.—E. H. Jones and Martin Laird (with second-class honours); C. H. Foggitt, P. S. D. Gowers, J. D. Hopewell, J. R. Horn, N. R. Marshman, Joan Pattison, Fritz Rudnicki, C. H. B. Sparrow and Per Turner.

University of Liverpool

At recent examinations the following were successful:—

FINAL EXAMINATION FOR M.B. AND CH.B.

Part I.—D. Annis, A. Ansell, E. R. Banner, Beryl R. Bentley, Margaret J. Blackburn, K. W. Boggis, H. O. M. Bryant, E. Burman, E. F. B. Cadman, Eva V. Cooper, K. H. Dalrymple, A. S. Davidson G. Davies, J. N. Dearnaley, J. F. Doherty, K. E. Donnellan, Ann Donnelly, I. H. Foy, H. Francis, H. G. Frank, H. Friend, S. M. Green, F. D. Griffiths, Elizabeth M. Harper, A. Jolleys, Eirwen M. Jones, S. E. Keidan, H. Lewis, I. P. Madhok, Margaret L. Magee, A. W. Merrick, A. F. Murphy, R. C. Nairn, K. H. Oldfield, C. Pownall, N. E. Raybould, R. L. B. Roberts, A. J. Robertson, P. L. Robinson, M. J. R. Ryan, Betty Schofield, E. Scott, E. R. Shepherd, K. H. Slatter, Hugh O. Williams and Margaret Woolfenden.

Part II.—E. H. Annels, A. S. Beadel, J. J. Bligh, S. Bradshaw, Hilda E. Bullen, E. R. Carter, W. P. Clothier, V. L. Cooper, H. V. Cross, J. G. K. Dean, P. J. Devlin, Jean M. Frazer, K. C. Fulton, Patricia F. M. B. Gould, Joan O. Grant, T. C. Highton, M. Horwich, R. D. Hotston, H. P. Hughes, F. A. H. Inman, W. B. E. Jones, J. J. Lieben, J. Littler, M. L. P. Lyons, Jane C. S. Maclachlan, L. Mandel, A. J. Marsden, R. H. Martin, R. H. Maudsley, Betty W. Morris, P. D. Moss, J. C. V. Murphy, S. P. C. O'Reagain, C. Pownall, G. J. Rees, Hilda M. Reeve, G. C. Roberts, C. D. Rosenwald, D. I. Rowlands, J. M. G. Sarson, T. L. Schofield, Irene W. Simpson, R. V. Tracy Forster, Amabel M. Turner, D. C. Watson, R. H. Wafts, G. A. Wetherell, D. W. Wilson, H. S. L. Young and Rosalind Zalin.

D.T.M.—P. Austin, P. R. Cooper, U. K. Menon, L. Merrill, G. Prasad and W. B. Young.

University of Dublin

At recent examinations at the School of Physic, Trinity College, the following were successful:—

M.D.—G. J. Dixon, R. T. Jackson and P. A. McNally.

FINAL EXAMINATION FOR M.B., B.CH. AND B.A.O.

Medicine.—B. W. Wyllie, E. D. Kerr, Alicia G. Pike (second-class honours); M. E. Weiner, W. G. Caldwell, A. F. Crowley, H. H. Robinson, J. R. Healy, H. B. Houston, W. J. Thompson and Isadore Shribman.

Surgery.—M. A. Majekodunmi, J. L. Handelman, Kathleen M. Patterson, N. H. Stewart, A. H. H. Guilbride, L. C. Jacobson, Simon Smullen, A. F. Crowley and C. D. MacCarthy.

Midwifery.—G. B. Gibson and Elizabeth D. L. Simpson (first-class honours); S. T. McCollum, G. S. Prince, Maude F. P. Bigger, Emmeline P. Crowe, Kathleen M. J. Morphy, P. C. Smyly, Margaret F. Y. Dixon, J. B. Dunlop, J. R. Hassard, M. J. M. Solomons (second-class honours); J. P. Hearne, J. P. Walsh, Helen S. Watson, T. A. H. Black, C. R. Griffin, Ivy K. Bayne, Ethna M. MacCarthy, L. H. Shrago, Gladys M. Byers, L. H. Citron, A. C. MacA. Hobson, G. F. Shaw, Bernard Kernoff, A. M. Russell, R. O. D. Reid, J. N. Greene, T. L. Kelly, A. G. Lee, Dorothy H. Webster, C. E. Williams, A. C. McReynolds, T. J. N. Bates, Harvey Lesselbaum, C. W. Lloyd, A. R. B. Jackson and D. J. Naughton.

D.P.H.—*Part I.*: William Hayes and F. W. Crook.

Epsom College

Scholarships.—The council of the college will shortly proceed to award St. Anne's scholarships to girls attending Church of England schools. Candidates must be fully 9 and under 16 years of age, and must be orphan daughters of medical men who have been in independent practice in England or Wales for not less than 5 years. The value of each scholarship is dependent upon the means of the applicant and the locality and fees of the school selected.

Pension.—The conjoint committee of the college will in May award a Christie pension of £89 a year to a necessitous medical man, fully 55 years of age, who has been registered for five years, and who is in need of help.

Forms of application for the scholarships and pensions can be had from the secretary's office, Epsom College, Surrey, and must be completed and returned by April 25.

Sir Bernard Docker presided over the annual meeting of the British Hospitals Association on March 28, when Mr. R. H. P. Orde, who has retired after 20 years from the post of hon. secretary, was elected a vice-president. In moving the adoption of the annual report Sir Bernard Docker explained the arrangements which had been made to ensure liaison with the Nuffield trustees in the development of the regionalisation scheme. He afterwards introduced the newly appointed secretary, Mr. J. P. Wetenhall, house governor of the West End Hospital for Nervous Diseases, to the meeting.

Care of Cripples

Speaking at the annual general meeting of the Central Council for the Care of Cripples, Mr. Ernest Brown, Minister of Health, said that the Government had accepted responsibility for looking after people injured by enemy action, or in the course of their military or civil defence services. But he relied upon the council to see to it that we were not allowed to forget or neglect the ordinary "civilian" cripple. Under the Emergency Hospital Scheme 19 orthopædic centres had been established in England and Wales, to which the majority of serious fracture cases, whether military or civilian, were transferred. At each of these centres there were skilled and experienced surgical staff—in one centre there was an American team and a physiotherapy department with trained masseuses. Facilities for physical training, games and occupational therapy were also being developed, and other hospitals are being brought into the scheme.

Mr. Brown asked what would be the effect of this scheme on the care of cripples after the war? Some of these special hospitals would disappear as the buildings in which they were housed returned to their normal uses; but some of them would make a permanent addition to the country's orthopædic services. The new hutment hospitals were not a collection of the old army huts, doomed to dilapidation. They were soundly constructed pavilions, built often in brick and concrete, and designed to endure for many years, full of light and air.

The meeting was presided over by Sir Geoffrey Peto, who said there must be a water-tight scheme for the continuous and expert treatment of every war-disabled casualty from the day of injury till his restoration to the Forces or to industry. This involved seven Government departments and was far from complete, but great progress had been made lately.

War-time Standards

On the outbreak of war the British Standards Institution realised that its peace-time procedure was inadequate to deal effectively with the new demands. A number of small executive committees were therefore set up for the various sections of its work, who were made fully responsible for the preparation of any war emergency specifications. They were given authority to restrict the usual wide consultation of industry to those interests directly concerned, and the reduction of the time usually given for comment on draft standards. Any British standards issued under war-time procedure will of course be reviewed directly peace comes again. Government departments are employing the institution's machinery for the preparation of war emergency specifications. The institution is invited to send a representative to appropriate meetings of the materials committee of the Production Executive, which is representative of all Government departments. The first issue of the war emergency specifications for tins and cans for food products and other commodities is estimated to have saved 40,000 tons of steel in the first year. The institution has also provided the Government, in connexion with the Purchase Tax, with definitions which give the dividing line between babies', children's, and adults' clothing.

Lieutenant J. M. Muir, M.B. Edin., R.A.M.C., has been awarded the D.S.O. for gallant and distinguished services in the field at Sidi Barrani.

The following awards have been made in recognition of distinguished services in the Middle East from August to November last year:—

O.B.E. (military division).—Major (temporary Lieut.-Colonel) A. O. Bekenn, M.R.C.S., R.A.M.C.; Major Devendra Nath Chakravarti, M.B. Lucknow, I.M.S.; Major (temporary Lieut.-Colonel) J. M. Macfie, M.C., M.B. Glasg., R.A.M.C.; Lieut.-Colonel James Melvin, M.C., M.B. Aberd., R.A.M.C.; Lieut.-Colonel (temporary Colonel) F. G. A. Smyth, M.B. Lond., R.A.M.C.; and Lieut.-Colonel (temporary Colonel) Q. V. B. Wallace, M.C., M.B. Dubl., R.A.M.C.

M.B.E. (military division).—Lieutenant H. R. Hartnell, M.R.C.S., R.A.M.C., and Lieutenant (acting Captain) Gerard Lorriman, M.B. Durh., R.A.M.C.

On April 13, at 6.45 P.M., Mr. Walter Deacon, president of the Pharmaceutical Society, which is celebrating its centenary, will give a talk in the home service on One hundred years of Pharmacy.

Since publication of the last list of subscriptions to the Medical War Relief Fund over £900 has been received, bringing the total to over £20,000.

A meeting of the North Western Tuberculosis Society will be held at the Tuberculosis Offices, 352, Oxford Road, Manchester, on Thursday, May 8, at 3 P.M., when Dr. S. Vere Pearson will speak on What are we aiming at in Collapse Therapy?

Notes, Comments and Abstracts

TO HOSPITAL BY AIR

SWEDEN has a service of air ambulances which fly to the help of sick people in remote districts whence other means of transport are slow and exhausting. In the past those living in such regions had to travel by Lapp sledge or boat and sometimes took several days to arrive at the nearest hospital—often too late for their lives to be saved. Surgeon-General Fritz Bauer reports[1] that there are now four aircraft in the ambulance service, operating from Stockholm, Östersund and Boden. Three are single-engine Junkers, the fourth a double-engine Beechcraft. In addition to the pilot and mechanic (who are members of the Swedish air force) each plane can carry two stretcher patients and has seating accommodation for two more people. Wheeled landing carriages, pontoons or skis can be fitted to the aircraft as required. No aerodromes await them in the lonely mountainous regions to which they penetrate; in summer they alight upon lakes, in winter on the snow fields. The first Swedish ambulance plane was bought in 1924 at the suggestion of Prince Charles, funds being provided by the Swedish Red Cross and the State. Since 1932 the service has been maintained entirely by the State. Experience shows that patients stand the journey well, and that most disorders can bear the light strain of flying in modern aircraft. Up to August, 1940, some 1700 people had benefited by the service; accidents have been few. There are now hopes of providing helicopters or autogyros adapted for stretcher cases; these of course would greatly simplify the problem of landing. The Swedish Red Cross and the government are persuading owners of private aircraft to adapt their machines to carry stretchers; subsidies will be given for this purpose provided that the machines are placed at the disposal of the nation in times of war. A committee set up by the Royal Aero-Club (K.S.A.K.) suggests that an international agreement would be welcome whereby builders of transport aeroplanes would be obliged to equip them to carry stretchers. International agreement on this or any other point would indeed be welcome.

A HOSPITAL GUIDE TO THE PURCHASE TAX

Mr. W. E. C. Baynes, barrister-at-law of the Inner Temple, has codified the purchase tax for the hospital administrator in a leaflet of four pages.[2] He sets out briefly the six general principles governing the application of the tax, lists the goods likely to be needed by a hospital which are subject to the tax or exempt from it, and even finds room for an appendix giving the simple drugs and simple chemical compounds which go free. No relaxation of the act is made for hospitals or other charitable institutions, though many of their needs are included in the list of exemptions, and where a hospital obtains goods from the wholesaler at a cheap rate the tax will often have to be paid on the higher rate which would be charged to the ordinary purchaser. An exception to this will be goods which are put up in special packs exclusively for hospitals. Surgical requirements are not subject to the tax, but some of them crop up unexpectedly under other headings—thus tax will have to be paid on india-rubber gloves along with every other kind from fur-lined to fabric, and bandages if they are not made up will, as textiles, have to pay the full 33⅓%.

Mrs. Clerke Brown of Hester's Cottage, Kingston Blount, near Oxford, whose son 2nd Lieutenant Charles Clerke Brown was reported missing in June 1940, and later killed, is anxious to get in touch with the relatives of any British doctor who was at the Hôpital Riband, St. Omer, last June.

The Society of Chemical Industry will hold the third of its discussion meetings on the nation's food at B.M.A. House, Tavistock Square, London, W.C.1, at 11 A.M. on Wednesday, April 9, when the subject will be vegetables as food.

Six lectures on industrial medicine for medical officers appointed to factories will be held in the medical school of the University of Birmingham on April 19 and 20. Further particulars may be had from the dean of the faculty of medicine, The Medical School, Birmingham 15.

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1. *Bull. Leag. Red Cr. Socs.* 1940, **21**, 102.
2. Central Bureau of Hospital Information. Memorandum No. 158. Obtainable from the director of the bureau, 12, Grosvenor Crescent, London, S.W.1. 3½d. post free.